Apple IIc Owner's Manual

Including *Apple Presents The Apple IIc: An Interactive Owner's Guide* and *System Utilities.*

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This revision of the *Apple IIc Owner's Manual* is dedicated to those Apple owners who used the Tell Apple Card in the back of their manuals to send us their ideas and suggestions.
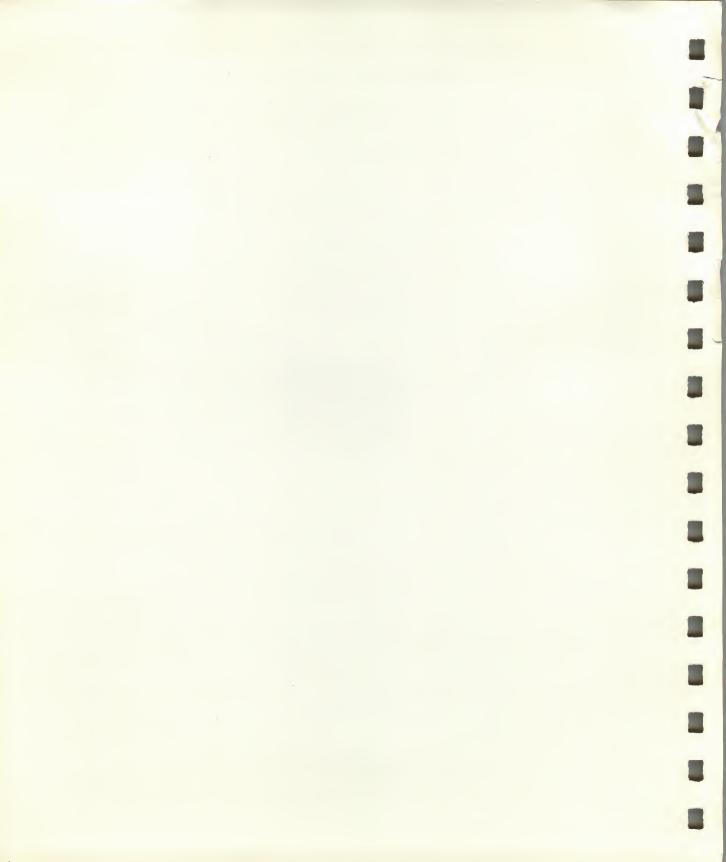
In the Apple tradition, we listened to you, and learned from you. Thanks for your help in improving our products.

Keep those cards coming!

Apple IIc Owner's Manual

Including *Apple Presents the Apple IIc: An Interactive Owner's Guide* and *System Utilities*

Introducing the Owner's Manual

The *Apple IIc Owner's Manual* is really two books in one. The first book is an interactive owner's guide designed to give you a hands-on introduction to the Apple IIc. The second book is a guide to the *System Utilities* disk that came with your Apple IIc. Among other things, the utilities disk contains programs that let you copy disks, check the contents of disks, and prepare disks to receive your information.

What You Get

Here's an overview of the topics covered in *Apple Presents the Apple IIc: An Interactive Owner's Guide*:

- introduction to the keyboard
- how to start and stop a program
- application programs—word processing, spreadsheet, data base
- how programs are loaded into memory
- how information is stored in memory
- how information is saved on disks
- elementary programming in BASIC and Logo
- peripheral devices (printers, modems, mouse, monitor, joystick)
- troubleshooting tips

Here's a list of the topics covered in the *System Utilities* booklet:

- copying files
- deleting files
- renaming files
- locking and unlocking files
- duplicating (copying) a disk
- formatting (preparing) a disk
- identifying or cataloging a disk
- setting up the Apple IIc to communicate with printers and modems

Each section has its own table of contents, but the glossary and the index at the back of the *Owner's Manual* apply to both the *Interactive Owner's Guide* and the *System Utilities* section.

Two Books In One: Earlier versions of *Apple Presents the Apple IIc: An Interactive Owner's Guide* and *System Utilities* were published under separate covers, but the content was virtually identical to what you'll find in the *Apple IIc Owner's Manual*.

Dig In

Okay, now dig in and enjoy your introduction to the Apple IIc, then do us a favor. Take a few minutes to fill out the Tell Apple form at the back of the manual. We want to be sure that we're giving you the information you need to get up and running quickly and productively. Let us know what you liked about the manual, and what you'd like us to do differently. Thanks.

Apple Presents the Apple IIc
An Interactive Owner's Guide

Contents

Figures and Tables

Radio and Television Interference

The equipment described in this manual generates and uses radio-frequency energy. If it is not installed and used properly—that is, in strict accordance with our instructions—it may cause interference with radio and television reception.

This equipment has been tested and complies with the limits for a Class B computing device in accordance with the specifications in Subpart J, Part 15, of FCC rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation, especially if a "rabbit ear" television antenna is used. (A "rabbit ear" antenna is the telescoping-rod type usually contained on television receivers.)

You can determine whether your computer is causing interference by turning it off. If the interference stops, it was probably caused by the computer or its peripherals. To further isolate the problem, disconnect the peripheral devices and their input/output cables one at a time. If the interference stops, it was caused by either the peripheral device or the I/O cable. These devices usually require shielded I/O cables. For Apple peripherals, you can obtain the proper shielded cable from your dealer. For non-Apple peripheral devices, contact the manufacturer or dealer for assistance.

If your computer does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures:

■ Turn the television or radio antenna until the interference stops.
■ Move the computer to one side or the other of the television or radio.
■ Move the computer farther away from the television or radio.
■ Plug the computer into an outlet that is on a different circuit than the television or radio. (That is, make certain the computer and the radio or television set are on circuits controlled by different circuit breakers or fuses.)
■ Consider installing a rooftop television antenna with coaxial cable lead-in between the antenna and television.

If neccesary, you should consult your Apple-authorized dealer or an experienced radio/television technician for additional suggestions. You may find helpful the following booklet, prepared by the Federal Communications Commission:

How to Identify and Resolve Radio-TV Interference Problems.

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock Number 004-000-00345-4.

Preface

Welcome to Apple

When you chose an Apple® IIc, you chose more than a machine. You chose a philosophy—that using a computer is fun. Sure, you can use your Apple IIc for all sorts of serious purposes, from balancing your books to tracking your investments, but there's no reason why you can't enjoy yourself while you're at it.

Learning to use a computer should be part of the fun—and it *is* fun, with the *Interactive Owner's Guide*, a hands-on introduction to the Apple IIc.

What You'll Learn

This hands-on guide will help you get comfortable with your Apple IIc. The guide will

- introduce you to the fundamentals of using the computer
- demonstrate some of the things you can do with your computer— like writing letters and balancing your budget
- introduce you to programming—the fine art of talking to the computer in its own language.

The guide won't teach you how to set up your computer, so read *Setting Up Your Apple IIc* before you read this book.

How You'll Learn

An *Interactive Guide* combines book, disk, and computer for personal instruction.

This guide has a unique way of teaching you about the Apple IIc. You learn by interacting with the computer—that's why it's called an interactive guide. The instructions that turn your Apple IIc into a

private tutor are recorded on the disks that came with this guide. The book is a bridge between topics covered on the disks and a reference to what you see on the screen, but most of your learning will come from hands-on experience.

Go through the guide at your own pace. Learning with a computer is different from learning in a classroom—you don't have to wait for a bell to take recess. And don't feel that you have to master everything in one pass. The guide won't self destruct after the first go-around. You can go through it until you're comfortable with the material and then come back to it any time you need a refresher course.

Who Should Read It

This book is designed primarily for newcomers to the Apple II family of computers. If you're a first-time user, chase any veterans out of the room so you can go through the book and disks alone. It's a personal computer after all, and learning to use it should be a personal experience.

If you've used other models of the Apple II, a lot of what you know will apply to the Apple IIc. If you decide to skim through the book, use the summaries at the end of each chapter to make sure you haven't missed anything. Even experienced users will find this guide helpful. If you're one of these people:

- Go through *Apple Presents the Apple IIc: An Introduction.*
- Read Appendix C, which describes differences between the Apple IIc and earlier models of the Apple II.
- Read the *System Utilities* Booklet that describes the utilities for the Apple IIc.

Who Shouldn't Read It: This book is not a technical reference manual. If you're looking for memory addressing maps, firmware listings, timing charts, and the like, ask your Apple dealer for the *Apple IIc Reference Manual.*

Once you've mastered the material in the guide, you'll be a competent, confident, full-fledged member of the Apple corps, but you won't know everything there is to know about computers.

Learning to use a computer is like learning to drive a car—your skill grows with your time behind the wheel. This guide will get you started; you'll learn about the brakes and the gas pedal, but you won't be ready for rush hour traffic. That comes with practice.

Where you go from here is up to you. You may decide to pick up another manual and learn to write programs. You may want to learn to use your computer for correspondence, budgeting, or keeping track of your jogging times and distances. One thing's for sure, your learning won't end with this book because there is no limit to what you can do with your Apple.

Whatever you do, relax and have a good time.

How It Works

As you explore this guide, you'll come to the symbols shown in Figure P-1.

The first symbol means "go to the disk" for some hands-on experience. The second symbol means "return to the book" for a recap of what you learned on the disk and for related information.

Look for these other visual cues throughout the manual:

By the Way: Text set off in this manner presents sidelights or interesting pieces of information.

Important!

Text set off in this manner—and with a tag in the margin—presents important information.

▲ **Warning**

Text set off like this indicates potential problems or disasters.

Computer **jargon** is boldfaced when it is introduced. Sometimes additional information about the term is in the margin; the term is always defined in the Glossary.

You will also see a special typeface used for what you type:

`It looks like this.`

Keys look like this: ⬅, ⌘, RETURN. When you see a hyphen joining two keys, it means to press them simultaneously. For instance, ⌘-CONTROL-RESET means all three keys should be pressed at the same time.

You'll also notice that some information is in italics and set apart from the rest of the text. This information is optional reading—it's related to the information in the main text, but it's not vital to your understanding.

Chapter 1   Meet Your Apple IIc

Sit down in front of your Apple IIc, and take a minute to identify the major parts that make up your computer (Figure 1-1).

Figure 1-1. The Apple IIc

Volume Control Knob: Lets you adjust the volume of the built-in speakers.

Built-in Disk Drive: Reads information from and writes information to disks, much the way a tape recorder plays and records music on a magnetic tape.

Keyboard: Your primary means of communicating with the computer.

Ports: Connectors for attaching a printer, and other accessories, to the Apple IIc.

Handle: For carrying the Apple IIc and for propping it up into a comfortable typing position.

Important!

Always prop the handle up under the Apple IIc when you are using the computer. It makes typing more comfortable and, more important, provides good air circulation around the computer.

The Cast of Characters

Some peripheral devices are built into the computer—like the disk drive, the speaker, and the keyboard. Other devices can be attached to the computer by cable—like the printer.

A display device is the bridge between you and your computer. It *displays* information.

Figure 1-2 shows the Apple IIc with a variety of accessories, known as **peripheral devices.** While there are lots of devices you can use with your Apple IIc, for purposes of this guide, you need only two: the disk drive that's built into the computer and a video monitor or television set to use as a **display device.**

Figure 1-2. The Apple IIc Computer System

Video Monitor or Television Set (With RF Modulator): Displays what you type and messages from the computer.

External Disk Drive: Reads information from and writes information to disks, just like the built-in disk drive.

Computer: Processes the information you put into it.

Hand Controls and Joystick: Control movement of creatures or objects around the screen in some game programs.

Mouse: Moves a marker across the screen in some programs.

An RF Modulator makes it possible for a TV set to tune in signals from the computer.

Printer: Prints information from the computer on paper.

Plotter: Draws charts and graphs created with the computer on paper.

Modem: Lets you communicate with other computers by phone.

You'll learn more about printers, modems, and other devices you can hook up to your computer in Chapter 5.

Computer Programs

What you do with your computer system depends on the programs (or instructions) that you put into it. Programs are stored on **flexible disks**, sometimes called **floppy disks**. (See Figure 1-3.)

Disks are to disk drives what tapes are to tape players. Some disks have information already recorded on them, others are completely blank (so you can use them to store your information).

The computer, the printer, and other devices are called **hardware**. Computer programs are called **software**.

Figure 1-3. Flexible Disks

Label

Oval Cutout

Input and Output

*You may hear the terms **input** and **output** applied to devices. An input device is one that carries information into the computer (like the keyboard). An output device is one that carries information out of the computer (like the monitor). A disk drive is both an input and an output device because it loads programs into the computer and it saves information from the computer to disks for storage.*

Input and output is abbreviated I/O. If you see the message I/O ERROR on your screen, it means there was a problem with the exchange of information between the computer and one of the devices. You can usually guess what the problem is based on what you were doing when the message appeared. If you were printing something, the problem is the connection between the computer and the printer. If you were loading something from or saving something to a disk, the problem is with the disk drive.

Handle With Care

The Apple IIc isn't made of porcelain—so handle it with care, but not with kid gloves. You can't break it by pressing the wrong key. You also can't break it by typing too vigorously. But one thing the Apple IIc can't stand is immersion in coffee, soda, or chicken soup. If you have one rule in the computer room, make it this one: "No drinking on the job."

Your disks are the most fragile part of the computer system. The next section shows you the correct way to put a disk in the disk drive. You'll find further tips on disk handling in the section on disks later in this chapter.

Putting a Disk in a Disk Drive

An Introduction is on the flip side of *The Apple at Play.*

Find the disk labeled *An Introduction.* This disk will introduce you to the special keys on the Apple IIc keyboard and to some concepts and procedures that are common to hundreds of other Apple II programs. It's a great way to get your feet wet.

Just follow these steps:

1. Push in on the built-in disk drive door, and it will pop up. See Figure 1-4. (If the cardboard packing material is still inside the drive, gently pull it out and throw it away. From now on, the only thing you should put inside your disk drive is a disk.)
2. Put *An Introduction* in the disk drive as shown in Figure 1-5. Make sure the correct label is facing up and that the oval cutout on the disk enters the disk drive first.

Figure 1-4. Open the Disk Drive

Figure 1-5. Put the Disk in the Disk Drive

3. When the disk is all the way inside the disk drive, push down on the door until it clicks shut. See Figure 1-6. This is important. If you forget to push down the door, the program won't run.

Important! Make sure the disk is all the way inside the drive before you close the door—you can hear it click when it's in place. Then be sure to close the door completely.

4. Turn on your video monitor or television set. See Figure 1-7.

Important! If you're using a television set, make sure the 80/40 Column switch on your Apple IIc (above the keyboard on the left) is set to 40 (the down position), that the channel selector on your television is set according to the instructions that came with your RF modulator (usually channel 3 or 4), and that the slide switch on the back of the modulator is *not* set to "Television," but to the "Computer" setting. (On some modulators, the "Computer" setting is referred to as the "Game" setting—a holdover from old times when RF modulators were used exclusively for video games.)

If you're using a monitor, make sure the 80/40 Column switch is set to 80 (the up position).

For more information, see "Lights and Switches" later in this chapter.

5. Reach around the left side of the computer and find the green switch in the lower-left corner. Press it to turn on the power of the Apple IIc. See Figure 1-8.

Figure 1-6. Close the Disk Drive

Figure 1-7. Turn On Your Monitor or Your Television Set

Figure 1-8. Turn On the Power
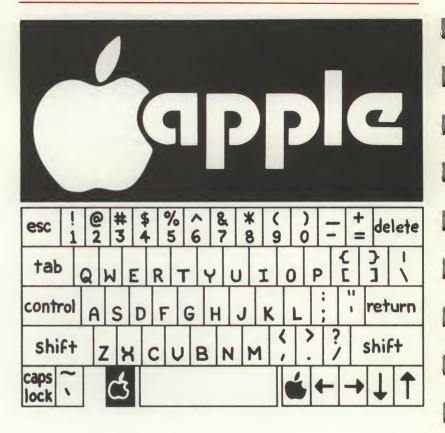
When you turn on the power, four things should happen:

- You'll hear a beep.
- The Power light (on the right above the keyboard) will light up.
- The Disk Use light (to the left of the Power light) will come on.
- You'll hear a whirring sound coming from your built-in disk drive.

Figure 1-9. Starting Up

Disk Use Light ———   Power Light ——

Figure 1-10. The Opening of *An Introduction*

Too Loud? Too Soft? If you don't hear any sounds or if the sound is too loud, adjust the volume control knob on the lower-left side of the Apple IIc.

Double-Sided Disks: Notice that information is recorded on both sides of the disks packed with this guide. These disks are certified for double-sided use. Most disks are designed for single-sided use (the disk drive uses only one side of the disk). Do not attempt to use both sides of a disk unless that disk is certified for double-sided use—most disks are not.

Hands On—An Introduction

Put this book aside for a while and learn to use your Apple IIc by following the instructions on the screen. Mark your place so you remember to come back here when you're finished.

Got A Problem?

If your screen doesn't look like Figure 1-10, do this:

- Check to make sure you have the right disk.
- Check to make sure the disk is right side up.

Then turn off the power and go back to "Putting a Disk in the Disk Drive."

If you don't see anything on the screen, do this:

- Make sure the monitor is turned on, plugged into the wall, and plugged into the computer.
- Try adjusting the monitor's contrast knob.
- If you're using a television, make sure the selector is set to the correct channel. Make sure the modulator is installed according to the instructions that came packed with it.

If you get the message `CHECK DISK DRIVE`, do this:

- Make sure the disk drive door is down. If it's not, push it down.
- If your disk drive door isn't the problem, you probably put the wrong disk in the disk drive or forgot to put any disk at all in the disk drive. Put in the correct disk.

Then turn off the power and go back to "Putting a Disk in the Disk Drive."

If you get the message I / O ERROR, do this:

■ Slide the disk partially out of the disk drive and make sure it's the disk labeled *An Introduction* and that the oval cutout entered the disk drive first. If you had the wrong disk in the disk drive or if you had the correct disk inserted the wrong way, put the correct disk in the disk drive (oval cutout first), turn off the power, then turn it on again.

If these steps don't solve the problem, consult the troubleshooting appendix. If you can't find the answer there, contact your dealer.

More About the Apple IIc

Welcome back. Take *An Introduction* out of the built-in disk drive and put it back in its paper envelope for safekeeping, but leave the Apple IIc turned on. You'll be using it again after this quick review.

The Cursor

The cursor marks your place on the screen. It's usually a blinking underline, but it can also be a blinking or solid square. See Figure 1-11.

Figure 1-11. The Three Cursors

Blinking Square
(Checkerboard)

Blinking
Underline

Solid
Square

You move the cursor by using the arrow keys on the keyboard. What happens when you move the cursor depends on the program you're using. In some programs, moving the cursor to the left erases every character in the cursor's path. In other programs, the cursor moves over characters without erasing them. The quickest way to find out how a cursor works is to experiment by pressing (DELETE), (←), (→), (↑), and (↓).

The Keyboard

As you discovered in *An Introduction,* the Apple IIc keyboard is a little different from the keyboard on your run-of-the-mill typewriter. For one thing, it has got a bunch of keys that typewriters don't have. These keys are highlighted in Figure 1-12.

But even the keys that look like typewriter keys can behave differently. In some game programs, you might press letter keys to make your electronic quarterback throw a forward pass. It's up to the programmer to determine how the keys work. Fortunately, most programs follow certain rules.

When you press this key while holding down (CONTROL), it causes some programs to restart (and you lose any data you were working with).

Pressing this key usually gets you back to the previous menu. *ESC* is short for *escape*.

Pressing this key by itself has no effect. It's used to make other keys work differently. When you see (CONTROL)-(G), for example, the hyphen joining the two keys means to hold down (CONTROL) while you press (G).

When this key is locked down, all the letters you type are capitalized, but no other keys are affected. So you can type uppercase letters and still type numbers.

Press this key to get uppercase letters and the upper character on two-character keys. It works just like the typewriter shift key.

Press the (SPACE) bar to insert space characters. That's right, to the computer a space is a character.

Figure 1-12. The Keyboard of the Apple IIc. The special keys are highlighted.

The Open-Apple and Solid-Apple keys make other keys work differently (like (CONTROL)).

Typists sometimes use the letters L and O interchangeably with the numbers 1 and 0. You can't do that on a computer.

The arrow keys move the cursor around the screen.

Pressing this key means you've finished typing something or that you're ready to proceed.

Some programs use this key to erase characters to the left of the cursor.
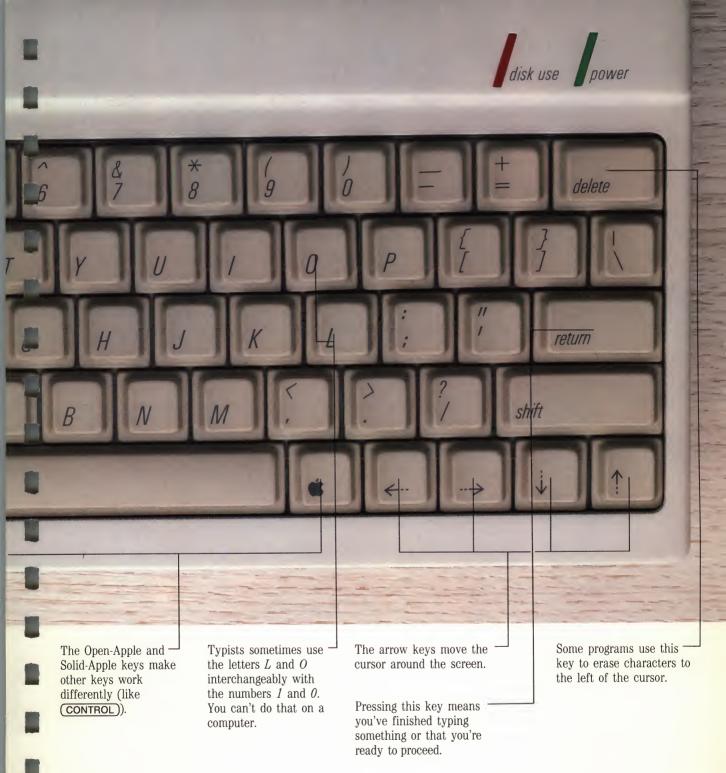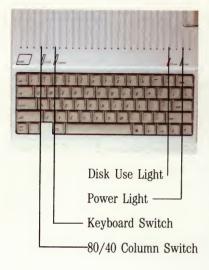
Lights and Switches

Figure 1-13. Lights and Switches

Disk Use Light

Power Light

Keyboard Switch

80/40 Column Switch

You should also be aware of the switches and lights located just above the keyboard. Figure 1-13 shows the Power light, the Disk Use light, the 80/40 Column switch, and the Keyboard switch.

■ The Power light is on when the computer's power is on.

Make sure the Power light is off before plugging any devices into the computer.

■ The Disk Use light comes on when the built-in disk drive is reading information from a disk or writing information on a disk. Don't open the disk drive while this light is on.

■ The 80/40 Column switch determines whether your screen will display 40 or 80 characters across. You must set the switch before turning on the computer.

Monitors produce sharper images (have better resolution) than televisions, so they can display 80 characters (letters, numbers, and so on) across. Televisions can clearly display only 40 characters across.

When the switch is down, it's set to 40 columns—the correct setting for televisions. When the switch is up, it's set to 80 columns—the correct setting for monitors. Once you set the switch, you shouldn't have to change the setting, unless you alternate between using a monitor and a television.

Some programs require an 80-column display. Some programs are designed to display only 40 columns and will show up as 40 columns whether your switch is set to 80 or not.
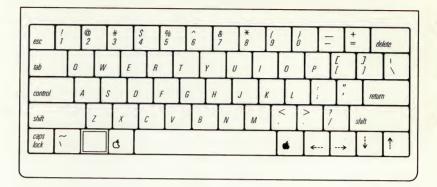
■ The Keyboard switch alternates between two keyboard layouts: the standard keyboard and the Dvorak keyboard.
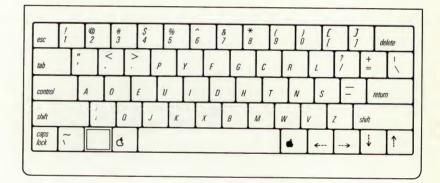
Pressing down the Keyboard switch gives you the Dvorak keyboard, also known as the American simplified keyboard. You'll know the Keyboard switch is set to the Dvorak keyboard if, for example, you type the letter *S* and the letter *O* appears on the screen.

The simplified keyboard was designed by August Dvorak to increase typing speed and efficiency by locating frequently used keys in the home-base row. See Figure 1-14.

If you choose to use the Dvorak keyboard, you'll probably want to rearrange the Apple IIc keycaps. Gently pry off the keys in the bottom row with a regular screwdriver. After that, you'll be able to pry off the remaining keys by hand. Rearrange them as shown in Figure 1-14.

Figure 1-14. The Standard Keyboard and the Dvorak (Simplified) Keyboard

What Now?

At this point you have several options:

- You can take a break.
- You can apply what you've learned to using the games and programs on *The Apple at Play* (or any game programs you have).
- You can go to Chapter 2 and learn how to use ready-made programs.
- You can go to Chapter 3 and learn about the inner workings of the computer.
- You can go to Chapter 4 and learn how to write your own programs.

But before you go off on your own, you need to know three things: how to start up the Apple IIc when the power is off, how to start up the Apple IIc when the power is on, and how to turn off the power when you've finished using the computer for the day.

Starting Up

Starting up is sometimes called booting. Don't let the jargon throw you—it all means the same thing.

A startup disk is a disk with one or more programs on it that starts automatically. All the disks that are part of the guide and most commercially available programs are startup disks.

There are two ways to start up the Apple IIc. You already know how to start up the Apple IIc when the power is off:

1. Put a startup disk in the built-in disk drive, also known as drive 1.
2. Turn on the monitor.
3. Turn on the power.

These steps are illustrated in Figure 1-15.

Figure 1-15. Starting Up With the Power Off

Important! | If you turn off the computer and then decide to turn it on again, be sure to wait 15 seconds.

Starting Up With the Power On

To start up when the power is already on:

1. Make sure the Disk Use light is off.
2. Take the last disk you were using out of the built-in disk drive, also known as drive 1.
3. Put the disk you want to start up into the built-in disk drive and close the drive door.
4. Hold down (⌂) and (CONTROL) while you press (RESET), then release all three keys. (If it seems a little awkward, you're doing it right. If it were more convenient, you might do it accidentally.)

These steps are illustrated in Figure 1-16.

This method—pressing (⌂)-(CONTROL)-(RESET)—is also known as restarting your computer.

Figure 1-16. Starting Up With the Power On

Start or Restart? Restarting is almost like turning the computer off and then on. But it's easier on the power switch. So if the power is already on, restart your computer by pressing (⌘)-(CONTROL)-(RESET).

Stopping the Computer

To turn off the computer:

1. Make sure the Disk Use light is off.
2. Turn off the monitor or television.
3. Turn off the Apple IIc power switch.

Important!   If you turn off the computer and then decide to turn it on again, be sure to wait 15 seconds.

By the Way: The computer uses less power than a 100-watt light bulb, so you don't need to turn it off for 20-minute coffee breaks.

You'll find *The Apple at Play* on the flip side of *An Introduction*.

If you want to use the programs on *The Apple at Play,* put it in the built-in disk drive and start up the Apple IIc. Make sure the side labeled *The Apple at Play* is facing up when you put it in the built-in disk drive. If you don't remember how to start up, review the instructions in "Starting Up" and "Starting Up With the Power On."

The Real World: The programs on *The Apple at Play* disk are not simulations. They are actual programs. They are included with the guide to give you a feel for the real world. Like real world programs, each program on *The Apple at Play* works a little differently. Read each program's instructions carefully. If you get stuck, don't worry about it. You can restart the disk by pressing
(⌘)-(CONTROL)-(RESET).

Your screen should look like Figure 1-17.

Figure 1-17. The Apple at Play *Menu*

```
            The Apple at Play Menu
_____

1.    <INTRODUCTION>

2.    Apple 21

3.    Financial Tools

4.    Lemonade

5.    Music Recital

6.    Space Quarks

7.    Quick Quiz

8.    Quit

Type a number, or select with the UP or
DOWN ARROW key.  Then press RETURN.
```

Here are the programs you'll find on *The Apple at Play:*

- **Apple 21:** Challenge the computer cardshark for big (but make-believe) bucks.
- **Financial Tools:** Figure loans, depreciation, and interest rates.
- **Lemonade:** Test your skill as the chief executive officer of a lemonade stand.
- **Music Recital:** Hum along with the Apple IIc.
- **Space Quarks:** Shoot 'em up in outer space.
- **Quick Quiz:** Test your mastery of the material in the guide. See what you know now, then come back later and see how your score improves.

Welcome back. Hope you enjoyed the game disk.

Look for Lemonade and other exciting educational games on *Apple Education Classics.*

Disks

Figure 1-18 shows a 5 1/4-inch flexible (floppy) disk—the kind you use with your Apple IIc.

Figure 1-18. A Flexible Disk

Label

Jacket

Oval Cutout

Write-Enable Notch

You can buy blank disks for storing your information. And you can buy disks containing programs—instructions that tell your computer what to do.

The disk itself is permanently sealed inside a black, plastic jacket that protects the disk from fingerprints and dust. The disk is made of thin plastic and is covered with metallic oxide so that information can be recorded on it magnetically—the way sound is recorded on cassette tape.

You can see part of the disk through the oval cutout in the disk jacket. Don't touch the disk through the oval cutout or you defeat the purpose of the jacket! When the disk drive is in use, the disk spins inside its jacket, so all areas of the disk can be reached through the oval cutout.

The notch on the upper-right corner of the disk is called the **write-enable notch.** If that notch is covered, you can't write (save) things on the disk or otherwise change the contents of the disk, but you can read (load) things from the disk. If the notch is uncovered, you can write on it. Writing doesn't take place through the notch. The notch just indicates whether or not it's OK to write on the disk.

Many programs that you buy don't have a write-enable notch because the manufacturer doesn't want you to change the contents of the disk. When you don't want the contents of your disks changed (by mistake), you can cover the write-enable notch with a removable **write-protect tab.** See Figure 1-19. (You'll find sheets of write-protect tabs packed with boxes of blank disks.)

As you may have noticed, it is possible to record information on both sides of a disk, but it's not recommended (the disks must be certified for double-sided use).

Put single-sided disks in the disk drive with the label facing up. If the disk doesn't have a label, put it in the disk drive with the seams facing down.

Figure 1-19. Cover the Notch With a Write-Protect Tab
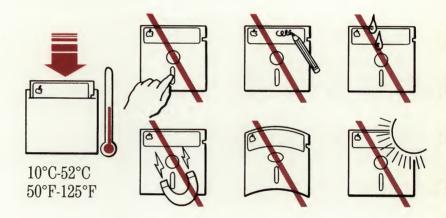
Write-Protect Tab

▲ **Warning**

Do not put a disk with a torn label or torn write-protect tab in the disk drive—the disk can become impossible to move.

Disk Capacity

Each disk can hold approximately 143,000 characters. How that figure translates into pages of text or number of financial models you can fit on a disk depends on the program you're using. You might be able to fit 50 to 75 pages of a novel on a disk, but only one financial model.

Care of Disks

It's best to store your disks in their envelopes in a disk holder. If you don't have a special disk holder, a shoe box works fine. Keep your disks away from direct sunlight (they warp), spilled milk (they drown), and things like telephones that contain magnets (they scramble). It's OK to leave your disks on the disk drive, but don't leave them lying on your monitor or TV. Write on disk labels with a felt-tip pen. Pencils and ball-point pens can damage disks. See Figure 1-20.

Figure 1-20. Do's and Don'ts of Disk Care

10°C-52°C
50°F-125°F

When Is It OK to Take Out a Disk? The simple answer to this question is that it's OK to take out a disk from the disk drive whenever the Disk Use light is off. But it's a little more involved than that.

Technically it's OK to remove the disk as soon as the sound stops and the light goes off, but it's not a good habit to get into. Here's why. Some programs are only loaded into the computer one piece at a time. As other pieces are needed, the computer looks for those pieces on the disk. If you've removed the disk, those pieces can't be loaded and the program hangs (or dies).

Until you learn to distinguish between programs that load one piece at a time and those that load in one fell swoop, leave your program disk in the built-in drive until you're finished using the program or until you're ready to save your work on another disk. (If you have an external disk drive, the only time you have to remove your program disk from the built-in disk drive is when you switch programs or use both drives for copying.)

Chapter 1 Summary

Starting Up With the Power Off

1. Put a startup disk in the built-in disk drive (drive 1).
2. Turn on your monitor.
3. Turn on the Apple IIc.

Starting Up With the Power On

1. Put a startup disk in the built-in disk drive (drive 1).
2. Hold down (⌂) and (CONTROL) while you press (RESET).

Special Keys

(RETURN)	Indicates that you've finished reading or typing something and that you're ready to proceed.
(ESC)	Gets you back to a previous menu or out of what you're doing.
(DELETE)	Erases characters to the left of the cursor.
(←) (→) (↑) (↓)	Moves the cursor.
(CAPS LOCK)	Capitalizes all letters automatically.
(CONTROL)	Make other keys behave differently.
(⌂) (🍎)	

Special Switches

80/40 Column switch	Determines whether screen displays 40 or 80 characters across. Should be set to 40 (down) for a TV and 80 (up) for a monitor.
Keyboard switch	Switches to an alternate keyboard, called the Dvorak keyboard.
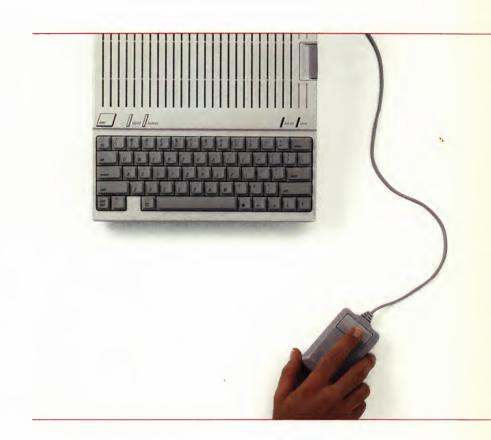
Chapter 2   Putting the Apple IIc to Work

So far you've been using the computer to learn about the computer. You can also use the computer to write letters, prepare business reports, play games, prepare your income taxes, balance your checkbook, file your recipes, catalog your stamp collection, address your holiday cards, keep your bowling team scores, and learn to pilot a plane.

The magic that transforms your computer from a cockpit to a file cabinet is the program you feed into it. Programs designed for a particular purpose or application are called **application programs**. You can write them yourself (as you'll learn in Chapter 4) or you can use ready-made programs.

Hands On—The Apple at Work

Notice that *The Apple at Work* disk has two sides—a 40-column side and an 80-column side. If you're using a television for a display device, the 40-column side of the disk should be facing up when you put the disk in the disk drive. If you're using a monitor, the 80-column side should be facing up.

Start up *The Apple at Work* for a demonstration of three popular types of application programs.

If you don't remember how to start up the computer, review the instructions in "Starting Up" and "Starting Up With the Power On" in Chapter 1.

Gibberish Fill the Screen? Take *The Apple at Work* out of the disk drive and check the label. If your 80/40 Column switch is down, you should have the 40-column side of the disk facing up. If your 80/40 Column switch is up, you should have the 80-column side of the disk facing up. Put the disk back in the disk drive and restart the computer (press ⌘-CONTROL-RESET).

Keep in mind that this disk is only a simulation; that is, you can't use it to write letters, prepare budgets, or organize your files. Once you have completed *The Apple at Work*, you'll be equipped to go to your dealer and choose the application programs that fit your needs.

By the Way: This is a simulation of a program called Appleworks. The actual program requires an 80-column display—you wouldn't be able to use it with a television set.

When you're finished with the disk, come back here for more on application programs.

Application Programs

Welcome back. *The Apple at Work* simulated three applications. Not all word processing, spreadsheet, and data base programs work the same way. Application programs vary tremendously in ease of use and in special features (bells and whistles) they offer. Decide which applications you want, then ask your authorized Apple dealer to help you select one that meets your needs. Plan to spend several hours learning to use each application program—and several weeks mastering each one.

Popular Programs

Here are short descriptions of the most popular applications.

- **Word Processing:** For writing. Lets you write, erase, rearrange, and otherwise speed the writing process. Figure 2-1 shows a typical word processing display.

Figure 2-1. Word Processing Display

```
File: holiday              REVIEW/ADD/CHANGE              Escape: Main Menu
=============================================================================
Dear Pat and Dick,

Sure is good to be writing you again. I can't believe it's been a year!

About the biggest news here is that we bought an Apple computer. In
fact, I'm using it right now to write you this letter. And you know if
butter fingers me can get it to work, it's got to be easy to use!

Nan and the kids are doing fine. Nan's been writing a lot of articles and
I'm still killing myself at the office. In my "spare" time I'm managing
Jimmy's ball team and let me tell you, those kids are GOOD.

How are your kids, by the way?  I'd really like to hear from you. Why not
buy a computer? It makes letter writing a breeze. Anyway, happy new
year and do keep in touch.


                              Love,

                              Harry and Nan


-----------------------------------------------------------------------------
Type entry or use OA commands    Line  3  Column  2        OA-? for Help
```

■ Data Base (or Data Management): For keeping track of lists of information, such as names, addresses, phone numbers, birthdays, inventories, or collectible objects. They make it easy to recall, update, sort, and cross-reference information. Figure 2-2 shows a typical data base program display.

Figure 2-2. Data Base Display

```
File: CELEB              REVIEW/ADD/CHANGE            Escape: Main Menu

Selection:  All records

Pseudonym           Real Name              Sign         Birth-year  Profession
==============================================================================

Arden, Eve          Quedens, Eunice        Taurus       1912        actor
Arthur, Jean        Greene, Gladys         Libra        1908        actor
Astor, Mary         Langhanke, Lucille     Taurus       1906        actor
Barrymore, John     Blythe, John           Aquarius     1882        actor
Brice, Fanny        Borach, Fanny          Scorpio      1891        comedian
Burns, George       Birnbaum, Nathan       Aquarius     1896        comedian
Checker, Chubby     Evans, Ernest          Libra        1941        singer
Crawford, Joan      Le Sueur, Lucille      Aries        1908        actor
Douglas, Kirk       Demsky, Issur          Sagittarius  1916        actor
Dylan, Bob          Zimmerman, Robert      Gemini       1941        singer
Evans, Dale         Smith, Frances         Scorpio      1912        actor




-------------------------------------------------------------------------------
Type entry or use OA commands    Line  3  Column  2       OA-? for Help
```

■ Spreadsheet: For producing financial statements, preparing budgets, estimating costs, and performing other number-crunching tasks you'd otherwise undertake with pencil, eraser, and calculator. Once you enter your information, you can try out different investments or pricing strategies without reentering the information. Figure 2-3 shows a typical spreadsheet display.

Figure 2-3. Spreadsheet Display

```
File: Wreckers.Budget       REVIEW/ADD/CHANGE            Escape: Main Menu
=======A======B======C======D======E======F======G======H======I=======J========
  1│
  2│                  BUDGET:   BIG BOY AUTO WRECKERS
  3│
  4│ INCOME
  5│            Raffle, Net                                          800.00
  6│            From Big Boy for uniforms    15.00      20           300.00
  7│ ----------------------------------------------------------------------
  8│ TOTAL INCOME                                                   1100.00
  9│
 10│ EXPENSES
 11│            Root Beer and Pizza                                  235.00
 12│            Bats                          8.00      20           160.00
 13│            Uniforms                     50.00      20          1000.00
 14│ ----------------------------------------------------------------------
 15│ TOTAL EXPENSES                                                 1395.00
 16│ ======================================================================
 17│ DONATIONS NEEDED                                                295.00
 18│
 
 
 
 --------A------B------C------D------E------F------G------H------I-------J--------
```

■ Education: For learning. Experience learning with a private and very patient tutor. Learn typing, Spanish, math, or anything else—at your own speed.

- **Home Finance:** For keeping track of income and expenses. Helps with budgeting, keeps track of deductible expenses for tax time, even helps balance your checkbook.
- **Communication:** For talking to other computers—big and small—by phone. With a communications program, such as Apple Access II, and a modem, you can tie into computerized information services for the latest stock prices or other information.
- **Games:** For fun. Shoot 'em up with enemy spacecraft or crawl through dungeons in quest of treasure.
- **Graphics:** For creating charts, graphs, or computer drawings.

Things You Can Do With Your Apple IIc

There are thousands of programs for the Apple II family of computers. Here's a list to give you an idea of some of the ways people use computers. The list is grouped by application.

Communication

- Get the latest stock quotes.
- Read the headlines between newscasts.
- Thumb through the card catalog at your nearest computerized library.
- Send messages to Apples across town or country.

Data Base

- Catalog your home library (and call up books by title, author, or color of cover—you can tell a book by its cover).
- Keep an inventory of your valuables for insurance purposes.
- Keep track of your jogging times and distances.
- Catalog your Elvis Presley memorabilia.
- Pick a recipe by ingredient (mushrooms), by name (Coq au Vin), or by nationality (French).
- Catalog your business card collection.

- Keep statistics on your favorite baseball team or little league.
- Computerize your phone book (then get a listing of potential tennis partners).

Education

- Study for college entrance exams.
- Learn to pilot a plane.
- Learn to read music.
- Learn math or spelling with electronic flashcards.
- Learn touch typing.
- Learn Spanish or French.

Games

- Chase gum drops through a maze.
- Find your way out of a dungeon.
- Shoot 'em up with space villains.
- Gamble at blackjack or roulette without losing your shirt.
- Play golf on a rainy day.
- Play a game of chess.

Graphics

- Draw house plans or wiring schematics.
- Create charts and graphs for business presentations.
- Draw a self-portrait (and see how you'd look with a mustache or bangs).

Home Finance

- Manage your own stock portfolio; make sure your broker is giving you sound advice.
- Prepare your income taxes.
- Do your banking without leaving home.

Specialty Programs

- Plan your diet and count calories.
- Do your own horse handicapping and improve your odds at the track.
- Write music.
- Find out if it's a good day for romance (check your horoscope).
- Keep a watering and fertilizing schedule for your house plants.

Spreadsheet

- Try out potential investments before you sink money into that kiwi farm in South Dakota.
- Find out if you can afford payments for a new car, yacht, swimming pool, or other extravagance.
- Do a cost estimate to see if it's feasible to add a second story to your house.
- Run a lemonade stand or other small business out of your garage.
- Prepare yourself to pay your income taxes by doing financial planning and budgeting year-round.

Word Processing

- Write a computer book (everyone else is).
- Write your resume and customize it for different job openings.

- Create a perfect business letter (without bothering your secretary) then personalize it for everyone on the board.
- Write a term paper (then change the margins to make it look longer).
- Write a novel (and change the name of the hero without a lot of retyping).

What Now?

The Apple at Work demonstrates what it's like to create and revise budgets, lists, and letters. Go to Chapter 3 to find out how the computer stores your budgets, lists, and letters while you're working on them and how you can save your work onto disks for permanent storage.

Chapter 2 Summary

Application programs are programs designed for a particular purpose, such as budgeting, financial planning, or cataloging your butterfly collection.

Popular Applications:

Word Processing	For generating letters, reports, and books.
Data Base	For keeping track of lists (addresses, inventories, collectibles).
Spreadsheet	For financial planning.
Education	For learning and expanding your horizon.
Graphics	For charts, graphs, and drawings.
Communication	For talking to other computers or computer services by phone.
Games	For fun.
Home Finance	For budgeting, portfolio management, and tax planning.

Chapter 3   The Inside Story

By now you've had some experience operating the computer. But what's going on behind the scenes? What makes the computer run? What really happens when you put a startup disk in the built-in drive and turn on the power?

Hands On—The Inside Story

Understanding how the computer works will eliminate its mystery and allow you to be more productive and playful with the machine. Start up *The Inside Story* disk to find out what makes your computer tick.

Meet the Players

Welcome back. Now you know what's going on under the hood. Here's a closer look at the components that put the computer through its paces (Figure 3-1). If you don't care about the innards of the Apple IIc, skip to "How It Works."

Figure 3-1. Main Logic Board

RAM (Short for random-access memory.): This is where programs and information are stored—the kind of information that changes from use to use and from user to user. Anything stored here is temporary. When you turn off the power, the information in RAM is erased.

Microprocessor: The brains behind the operation. The microprocessor carries out the instructions in the program.

ROM (Short for read-only memory.): Anything stored here is permanent and not changeable by the user! ROM contains, among other things, information the computer needs to get started. The programs in ROM are called firmware because they are more permanent than software.

Figure 3-2. Close-Up of Chips

RAM, ROM, and the microprocessor are integrated circuits (ICs): networks of microfine wires that conduct electrical impulses. The circuits are etched on silicon wafers, which reside on black, plastic chips that look like mechanical centipedes. See Figure 3-2.

The centipede legs are pins that connect the computer's memory (RAM and ROM) to the brain (the microprocessor) via electrical roads called traces.

In addition to the RAM, ROM, and the microprocessor, there are custom-made ICs that interface (or manage communication) between the microprocessor and **peripheral devices**. The Apple IIc has built-in interfaces for a second disk drive; a printer or plotter; a modem; and a mouse, joystick, or pair of hand controls.

Interface is a fancy word for go-between.

A peripheral device is an accessory.

How It Works

You don't need to know everything about how the computer works to run programs successfully. But you should have a feel for what it means to start up (or boot) the computer, create information, save information in a file on a disk, and retrieve information.

Starting Up
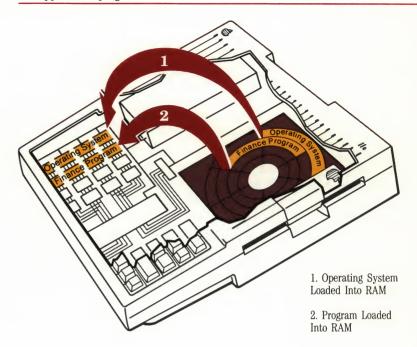
You've already had lots of practice with this one. It's what you do when you put a disk in the built-in disk drive and turn on the power. (Or when you hold down (Ⓒ) and (CONTROL) while you press (RESET). This method of starting the computer with the power already on is also called **restarting**.)

Every time you start your computer, a built-in program looks for a certain kind of disk in the built-in disk drive, drive 1. It's looking for a disk with an **operating system**. When it finds one, the operating system is put into **memory**.

Memory is a general term for RAM—the storage compartments inside your computer that hold programs and information you're working on. Computer memory capacity is measured in K's, short for **kilobyte**. (A kilobyte is to a thousand what a baker's dozen is to a dozen—1024 bytes to be exact.) One byte holds one character. The Apple IIc has 128K RAM, more than enough for most popular business and entertainment programs.

The operating system is a combination traffic cop and housekeeper. It controls the way your program is loaded into memory, the way the computer works with information, the way your information will be stored on a disk, and the way the computer talks to your printer and other peripheral devices. Once the operating system is in memory, the application program is put into another part of memory, and your computer takes on its personality as a number cruncher or space invader. See Figure 3-3.

Figure 3-3. Starting Up. Once the operating system is in memory, it loads the application program.

1. Operating System Loaded Into RAM

2. Program Loaded Into RAM
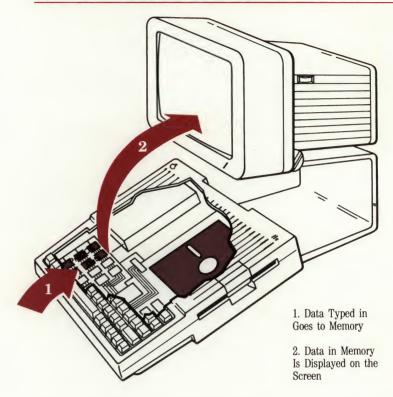
Creating Information

When your application program is in memory, you can start using it to figure out investment strategies, to compose sonnets, or to design sports cars—depending on what kind of program is in memory.

The numbers, words, and other raw information you feed into the computer are called **data**. As you type information, it is sent to yet another part of memory and displayed on the screen where you can see it. Figure 3-4 illustrates how the operating system, the application program, and your data share memory.
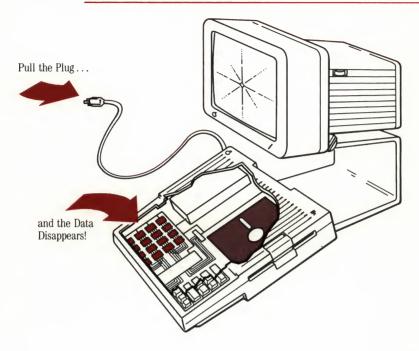
Figure 3-4. Your Information Is Kept in Memory, Too

1. Data Typed in
Goes to Memory

2. Data in Memory
Is Displayed on the
Screen

It's important for you to realize that what you see on the screen is
only temporarily stored in the memory of the computer. It's not like a
typewriter where what you type appears on a page in a more or less
permanent form.

If you turn off your computer, switch to another program, or trip over
the power cord, your data is gone forever. See Figure 3-5. That's why
it's important to save a copy of your work on a disk. It's a good
idea to save your work every ten minutes or after any particularly
inspired entry.

Figure 3-5. Memory Is Temporary

Pull the Plug . . .

and the Data
Disappears!

Scrolling: There's a lot more room in memory than there is room on
the screen to display it. You can use the arrow keys in most programs
to see other information in memory. Just move the cursor to an edge
of the screen by using one of the arrow keys. Press the arrow key
again, and a new line or column will come into view. This is called
scrolling and is illustrated in Figure 3-6.

Figure 3-6. Scrolling

Saving Information on a Disk

A file is a collection of information. It can be a poem, a profit/loss statement, a phone list, and so on.
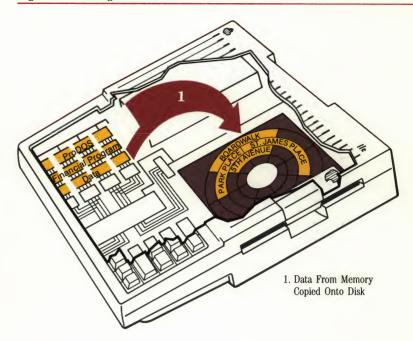
When you save the information in memory onto a disk, you put it in a file. Think of your disk as a file cabinet; think of each file as a folder where you keep your information. How you save the information in a file on a disk varies from program to program.

The computer doesn't transfer what's in memory to the disk, it only sends a copy. Your information stays in memory until you turn off the computer or start working with different data. See Figure 3-7.

Figure 3-7. Saving Information in a File on a Disk

1. Data From Memory
Copied Onto Disk

Information stored on a disk is much more permanent than information stored in the memory of the computer. But even information on a disk is vulnerable. That's why it's a good idea to keep at least two copies of all your data disks. This practice is called **backing up.** Most application programs will tell you how to make backup copies.

Formatting Disks: Before you can save your work on a blank disk, you have to format the disk. Formatting a disk means dividing the magnetic surface of the disk into sections (called **sectors**) where information can be stored. The reason disks don't come preformatted is that different computers require different formats. (You need to format a disk only once. If you format the disk again, everything on the disk is erased.) You'll learn everything you need to know about formatting in the *System Utilities* part of this manual.

Filenames

When you save a file on a disk, you give that file a name. You can name your files anything you want as long as you observe these general filename rules:

- Maximum of 15 characters long.
- Numbers, letters, periods (no other punctuation) permitted.
- Must begin with a letter.
- No spaces permitted.

Some programs have slightly different rules, but if you follow these, you can't go wrong.

Retrieving Information From a Disk
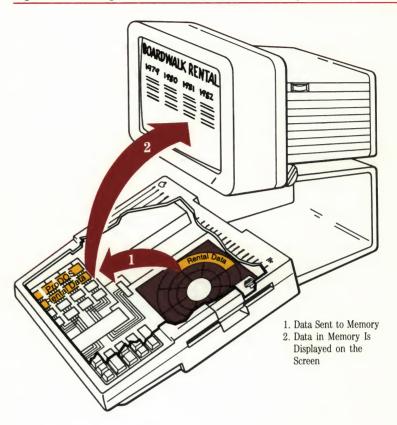
To retrieve information you've saved on a disk, you start up the computer with the program you used to create the data, you ask for the file by name, and a copy of the file is loaded into the memory of the computer. (Again, how to retrieve information from a disk varies from program to program.) See Figure 3-8.

A **data disk** is a disk you use to store information.

Once the information is loaded into the computer's memory, you can print it (if you have a printer hooked up to your computer), you can revise it, and you can save the new version in a file on your **data disk**.

The fact that you're only loading a *copy* of the file into memory frees you to rewrite and rearrange the information. If you don't like the results of your experiments, your original is still intact on the disk.

Figure 3-8. Loading the Contents of a File Into Memory

1. Data Sent to Memory
2. Data in Memory Is Displayed on the Screen
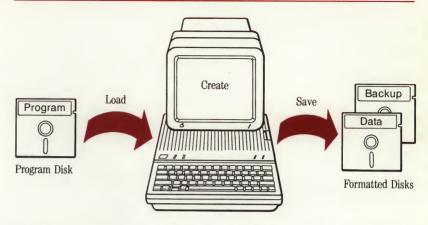
Once you finish working with a file, you can save it with the same name you used before, or you can give it a new name. If you save the revised information with the original filename, you write over (and lose) the original data. If you save the revised information with a new filename, both the original and the revised version are preserved on the disk. Each file on a disk must have its own unique name.

Putting It All Together

Figure 3-9 illustrates the process of using an application program: starting up, creating information or data, saving the information in a file on a disk, and backing up that information.

Figure 3-9. Using an Application Program

Programs and Data Don't Mix: It's possible to combine programs and data on the same disk, but it's not a very good idea. For one thing, application programs can take up a lot of space on the disk, and while you might be able to squeeze one or two letters on your word processing program disk, you couldn't make a habit of it.

For another thing, many startup disks don't let you save data on them. They're **write protected**, which means you can't add anything to or change anything on the disk. Finally, startup disks are expensive. Application programs can cost hundreds of dollars. You don't want to risk erasing or copying over one by mistake.

Operating Systems

Most of the time you can ignore the operating system. It does its work behind the scenes. The only time you have to be concerned about the operating system is when you're formatting new disks and when you're saving information on disks.

There are three operating systems available for the Apple IIc (ProDOS™, DOS 3.3, and Pascal), and each operating system saves information on disks in a different way.

If your word processing program uses ProDOS, you have to save your data on ProDOS-formatted data disks. If your data base program uses the Pascal operating system, you have to save your data on Pascal-formatted data disks.

Figure 3-10. Separate Disk Holders
for Different Programs

Figure 3-11. Label Data Disks With
the Operating System

Early DOS: The Apple IIc does not support DOS 3.2 or other operating systems designed for very early versions of the Apple II. But you can update programs and files created with those operating systems to DOS 3.3 by using a program on the utilities disk for the Apple IIc.

You can't keep your word processing and data base data on the same disks unless the two programs use the same operating system.

Most people use only one or two programs for the bulk of their work, so it's not difficult to keep data disks straight. One solution is to keep separate disk holders for data created with different programs. See Figure 3-10.

Another solution is to label your data disks with the name of the program or operating system. See Figure 3-11.

Chapter 3 Summary

Main Parts of the Computer

Microprocessor	Does the computing. Carries out the instructions in computer programs.
RAM	Short for **random-access memory**. This is where programs and data are stored temporarily. Whatever is in RAM goes away when power goes off.
ROM	Short for **read-only memory**. Permanent memory. Contains, among other things, information the computer needs to get started.

Four Steps to Using a Computer

1. Starting up. Put a startup disk in drive 1, the built-in drive, and turn on the power.
2. Creating information. Use the keyboard to create letters, budgets, charts.
3. Saving information. Give what you've created a name and store it in a file on a disk for permanent storage.
4. Retrieving information. Load information from a file back into memory where you can change the contents of the file or send the contents of the file out to a printer to produce a paper copy.

Chapter 4   Programming

Writing a computer program involves taking a task, breaking it down into small steps that the computer can perform, and expressing those steps in terms the computer can understand. There's a program for almost every application under the sun, so you don't have to learn how to program. But a lot of people learn for the fun and the challenge of it.

Why Program?

There are lots of good reasons for learning to program:

- It's an exercise in logic.
- It lets you write programs specific to your needs.
- It lets you control the operation of the computer.
- It gives you something to talk about with your child who is learning how to program in school.
- It helps justify the time you spend in front of your TV.
- It gives you the chance of writing a best-selling program.
- It's easier to understand the programs you buy.

But don't learn to program because you think you have to.

Why Not Program?

There are also good reasons for *not* learning to program:

- You can use the computer successfully without knowing anything about programming, just as you can successfully drive your car without knowing how the engine works.
- Writing programs takes time—lots of it—and you might have other ways you'd rather spend yours.

Learning to Program

If you'd like to find out what programming is all about, you've come to the right place. There are two disks in the guide designed to give you a feel for programming: *Exploring Apple Logo* and *Getting Down to BASIC*.

Don't Be Shy: Sampling these disks doesn't commit you to a life of programming. Even if you decide to leave programming to others, the skills you will learn—putting small pieces together to form a large structure and breaking large problems down into manageable steps— are valuable skills whether you program or not.

Just as there are different human languages, there are different computer languages. Logo and BASIC are two computer languages especially suited to new programmers.

If you decide you'd like to learn more about BASIC, you can get the *Applesoft Tutorial* and the *Applesoft BASIC Programmer's Reference Manual* from Apple, or you can choose books from another publisher more suited to your age, your area of interest (games, graphics, and so forth), and your level of programming expertise (from tutorials to technical reference manuals). If you'd prefer a more interactive learning experience, you can get an entire Applesoft BASIC training course on disk, similar to the interactive training programs that came with this manual, or you can enroll in a programming class at your local college.

If you decide you'd rather program in Logo, Pascal, or some other language, ask your dealer for the appropriate language disks, manuals, and other training materials.

Logo

Logo is rapidly becoming a standard in the schools, because it's easy and fun to learn (with lots of emphasis on graphics), yet powerful enough for serious programming. In addition to building computer skills and confidence, Logo builds communication skills, as children and adults bounce programming ideas off each other.

Hands On—Exploring Apple Logo

Exploring Apple Logo is on the flip side of *The Inside Story*. Make sure the *Exploring Apple Logo* label is facing up when you put it in the built-in disk drive.

Figure 4-1. Logo Art

Start up *Exploring Apple Logo*. Mark your place so you know to come back here when you're finished.

If you don't remember how to start up, review the instructions in "Starting Up" and "Starting Up With the Power On" in Chapter 1.

Logo Revisited

Welcome back. *Exploring Apple Logo* teaches you some important programming concepts. It teaches you to combine simple steps into increasingly complex procedures. You can see why Logo is a popular language with parents who want to learn about computers along with their kids. You can write Apple Logo programs for fun or for serious applications—like the compound interest program you saw on *Exploring Apple Logo*. Figure 4-1 shows you the kind of graphics you can create with Apple Logo.

If you'd like to have Apple Logo for yourself or your family, ask your Apple dealer for the Apple Logo II package. This package includes the Logo language disk, a reference manual, a clear and easy to follow Logo Tutorial, and a training disk that introduces more Logo features.

BASIC

BASIC (short for **Beginners All-purpose Symbolic Instruction Code**) is also easy to learn. BASIC allows you to write instructions for the computer in English-like words and phrases. It has the additional advantage of being built into your computer (so it's free).

BASIC was the first language built into personal computers, so you'll find that a lot of your computer friends speak the same language. There are several different dialects of BASIC. The Apple IIc dialect is called Applesoft BASIC.

Hands On—Getting Down to BASIC

Start up *Getting Down to BASIC,* and come back here when you're finished. If you don't remember how to start up, review the instructions in "Starting Up" and "Starting Up With the Power On" in Chapter 1.

Getting Down to BASIC

Welcome back. *Getting Down to BASIC* introduced you to a lot of programming concepts. This section summarizes the disk and introduces you to some more Applesoft BASIC. Remember, though, that only a small portion of Applesoft BASIC is covered here. For a description of Applesoft in all its glory, ask your dealer for the *Applesoft Tutorial* and the *Applesoft BASIC Programmer's Reference Manual.*

Getting Into BASIC

Before you can write BASIC programs, you have to get into the BASIC programming environment. There are a couple of ways to do this. You can start up *Getting Down to BASIC* and choose the Quit option, or you can start up *System Utilities* and choose the Exit option. Either method loads ProDOS and gets you into Applesoft BASIC.

Printing Numbers and Doing Calculations

Applesoft's PRINT statement lets you print information on the screen. One function of the PRINT statement is to print numbers. To print the number *5,* you'd type **PRINT 5** and press (RETURN). You can use your computer as a calculator to add, subtract, multiply, and divide using these symbols:

Addition	+
Subtraction	—
Multiplication	*
Division	/

To multiply 44 by 55, you'd type **PRINT 44 * 55**.

Don't forget that you must press (RETURN) after every Applesoft statement.

Moving On

Your computer can do calculations that require more than one operation. Here's the order in which Applesoft performs such calculations:

Parentheses (innermost first)	( )
Multiplication and Division	* /
Addition and Subtraction	+ —

Calculations of the same type (two additions) or of the same priority (for example, addition and subtraction) are performed from left to right.

See if you get the same answers:

$9 + 4 * 3 = 21$

Hint: The computer does multiplication before it does addition.

$(9 + 4) * 3 = 39$

Hint: The computer always does what's in parentheses first.

$4 - 16 / 4 = 0$

Hint: The computer does division before subtraction.

$(2 + 3) + (4 * 3) + 6 / (1 + 1) / 3 = 18$

Hint: The computer does what's in parentheses first. Then, by priority, the computer performs calculations of the same type from left to right. Division is done before addition.

When in doubt, put parentheses around the operation you want done first.

Computer as Calculator: You can use your computer as a calculator any time you're in Applesoft BASIC. As you know, there are several ways to get into Applesoft BASIC. But if all you want to do is use your computer for some calculations, it's quicker to start up your computer without a disk in the built-in disk drive. Take the disk out of the disk drive and hold down (CONTROL) while you press (RESET). (This puts you into Applesoft BASIC, but does not load ProDOS—you'll be able to write programs and do calculations, but you won't be able to save them on a disk.)

Printing Words

When you want the computer to display a word or any set of characters, type what you want to see inside quotation marks. To print the words *JIGSAW PUZZLE*, you'd type

`PRINT "JIGSAW PUZZLE"`

To print the equation *3 + 4*, you'd type

`PRINT "3 + 4"`

If you wanted to know the sum of *3 + 4*, you'd type

`PRINT 3 + 4`

without the quotation marks.

Moving On

A Typing Timesaver: In Applesoft BASIC, you can use a question mark (?) in place of PRINT. For example, if you type `PRINT 4 + 4` or `?4 + 4`, the Apple displays **8**.

Formatting Print Statements: If you use a semicolon between parts of a PRINT statement, the parts are printed next to each other without any extra spaces. For example, if you type

`PRINT "2 + 3 ="; 2 + 3`

the computer displays **2 + 3 = 5**.

Notice that the semicolon goes outside the quotation mark.

Writing Programs

A computer program is a set of instructions that tell the computer what to do. You can write Applesoft BASIC statements in either immediate execution or deferred execution. In **immediate execution**, each statement is executed immediately after you press (RETURN).

In deferred execution, each statement you type is put into the computer's memory and stored until you type **RUN** to execute the program. To write a statement in deferred execution, you must begin the statement with a line number.

Remember, you can press ⊖ and ⊕ to correct typing mistakes.

`10 PRINT "HI THERE"` is an example of a deferred execution statement.

Every program should end with an END statement. The END statement tells the computer that the program is finished.

To see the lines of your program on your screen, type `LIST`.

Here's a summary of how to add, delete, insert, and correct lines in your program:

- To add a line to a program, type a new line number, followed by the statement, and then press (RETURN).
- To delete a line from a program, type the line number of the line you want to delete and press (RETURN).
- To insert a line in a program, type a line number that's between two existing line numbers, followed by the statement, and then press (RETURN).
- To correct a line in a program, retype the line number and then type your revised statement.

Moving On

Adding Blank Lines: To add a blank line to a program, simply type a line number, followed by `PRINT`, and then press (RETURN).

If you type this program,

```
10 PRINT "FEE  FI"
20 PRINT
30 PRINT "FO FUM"
40 END
```

your screen will show

```
FEE FI

FO FUM
```

Variables and INPUT Statements

A variable is a name for a place inside your computer where information is temporarily stored.

There are two kinds of variables:

- Numeric variables (for storing numbers).
- String variables (for storing groups of characters, like names).

Every variable must have a name. Here are Applesoft's rules for naming variables:

- Every variable name must begin with a letter.
- A string variable name must end with a dollar sign ($).
- Applesoft uses only the first two characters of a variable name to distinguish one variable from another. So, to Applesoft, TEST1 and TEST2 are the same variable. But it's a good idea to use whole words for variables because they're easier to remember than a pair of letters. Just make sure the first two characters are unique.

BASIC Reserved Words: As you're writing programs that use variables, avoid the following words and abbreviations and any words that include these words, like LETTER. (They're either Applesoft BASIC commands or ProDOS commands.) If you forget and use one of these commands as a variable by mistake, BASIC will try to use it as a command with unfortunate results.
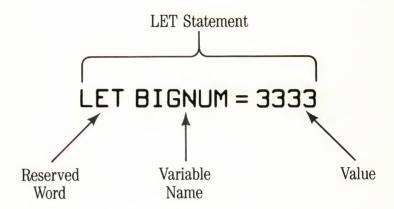
&	EXP	LOG	RND
	FLASH	LOMEM:	ROT=
ABS	FLUSH	MID$	RUN
AND	FN	NEW	SAVE
APPEND	FOR	NEXT	SCALE=
ASC	FP	NORMAL	SCRN(
AT	FRE	NOT	SHLOAD
ATN	GET	NOTRACE	SIN
BLOAD	GOSUB	ON	SPC(
BRUN	GOTO	ONERR	SPEED=
BSAVE	GR	OPEN	SQR
CALL	HCOLOR=	OR	STEP
CAT	HGR	PEL	STOP
CATALOG	HGR2	PEEK	STORE
CHAIN	HIMEM:	PLOT	STR$
CHR$	HLIN	POKE	TAB(
CLEAR	HOME	POP	TAN
CLOSE	HPLOT	POS	TEXT
COLOR=	HTAB	POSITION	THEN
CONT	IF	PREFIX	TO
COS	IN#	PRINT	TRACE
CREATE	INPUT	PR#	UNLOCK
DATA	INT	READ	USR
DEF	INVERSE	RECALL	VAL
DEL	LEFT$	REM	VLIN
DELETE	LEN	RENAME	VTAB
DIM	LET	RESTORE	WAIT
DRAW	LIST	RESUME	WRITE
END	LOAD	RETURN	XPLOT
EXEC	LOCK	RIGHT$	XDRAW

Don't worry if most of these commands are unfamiliar to you. You need to know only a handful of them to get a feel for programming in Applesoft BASIC. If you want to learn more, get the *Applesoft Tutorial* and the *Applesoft BASIC Programmer's Reference Manual*.

The LET Statement

The LET statement lets you assign a value to a variable from within a program. **LET BIGNUM = 33333** creates a variable named BIGNUM and assigns the value 33333 to that variable. The *LET* in a LET statement is optional. So, to Applesoft, **LET BIGNUM = 33333** and **BIGNUM = 33333** mean the same thing. Figure 4-2 illustrates the anatomy of a LET statement.

Figure 4-2. Anatomy of a LET Statement

LET Statement

LET BIGNUM = 3333

Reserved Word   Variable Name   Value

The INPUT Statement

The INPUT statement lets you assign a value to a variable from the keyboard. An input statement is usually preceded by a PRINT statement that asks a question. Each time the computer sees an INPUT statement, it

- puts a question mark on the screen
- creates a variable with the name given in the INPUT statement
- assigns whatever number or word you type to the variable.

Getting Your Program Onto a Disk (and Off Again)

You learned enough on the *Getting Down to BASIC* disk to write simple BASIC programs. The next step is to learn how to save your programs on a disk so you don't have to start from scratch each time you sit down at your computer.

There are several activities that work hand in hand with saving programs on a disk: loading programs from a disk, cataloging a disk to see what's on it, and deleting programs from a disk. You'll learn about these four disk related activities, or commands, in this section.

By the Way: These are not BASIC commands. They are ProDOS commands. But they are indispensible to BASIC programmers.

Before you can save a program on a disk, you have to format the disk, so that's a logical place to start this discussion of ProDOS commands.

Formatting

As you learned in Chapter 3, formatting a disk divides it into sections where information can be stored. BASIC programs use the ProDOS format. If you have a blank disk handy, you might as well practice this important activity right now so you'll have a place to save the programs you write. (If you don't have any blank disks, you can save your first few programs on the *Getting Down to BASIC* disk, which is already formatted for ProDOS.)

▲ Warning

Do not format the *Getting Down to BASIC* disk. Just save your programs on it.

The ProDOS formatting program is on the *System Utilities* disk that came with your Apple IIc. Find that disk and follow these instructions. (If you find the instructions a little sketchy, read about formatting in the *System Utilities* section of this manual for further information.)

Formatting a Disk for BASIC Programs

1. Start up *System Utilities*.
2. Type ⑥ and press (RETURN) (to select **Format a Disk** from the Main Menu).

3. Press (RETURN) (to indicate that you'll be using your built-in disk drive to format your disk).

4. Press (RETURN) (to indicate that you want to format your disk for ProDOS).

5. Type your name or any other word (as the name of the disk you're about to format) and press (RETURN).

6. Take *System Utilities* out of your built-in disk drive, replace it with a blank disk and press (RETURN). You'll hear some whirring and eventually you'll see the message: **FORMATTING COMPLETE.**

7. If you get the message **OKAY TO DESTROY:**, then the disk you put in was not blank. Select **N** for *no*, replace the disk with a blank disk, and try again.

That's all there is to it.

Once you've got your formatted disk, you can get into the BASIC programming environment, write your program, and save it.

Getting Into Applesoft BASIC

As you've already learned, there are a couple of ways to get into Applesoft BASIC. You can start up *Getting Down to BASIC* and choose the Quit option, or you can start up *System Utilities* and choose the Exit System Utilities option. Either method loads ProDOS and gets you into BASIC.

Saving a BASIC Program

Saving a program is simple. Just put your formatted disk into your disk drive, then type **SAVE** followed by a name you give the program (for example, **SAVE PUZZLE**).

To save a program on a disk in the external drive, type **SAVE**, then the name of the program, then a comma, then D2 (for example, **SAVE PUZZLE,D2**).

Naming Programs

When you store a program on a disk, you give it a filename. Every filename must follow the rules set out by ProDOS. According to these rules, every filename must

■ begin with a letter
■ be 15 characters or less.

A filename cannot

■ contain any spaces
■ contain any characters other than letters, numbers, or periods.

Running a Program

To run a program that's stored on a disk, all you have to do is get into Applesoft BASIC, put the disk containing your program into your disk drive, then type **LOAD** followed by the name of the program (for example, **LOAD PUZZLE**). To load a program from a disk in the external disk drive, type **LOAD**, then the name of the program, then a comma, then **D2** (for example, **LOAD PUZZLE, D2**). Then type **RUN** to run the program that's in memory.

A Short Cut: Up to this point, you've used the LOAD command to load a program into the computer's memory and the RUN command to run the program you've loaded. You can save some keystrokes by typing RUN and then the name of the program that's stored on the disk. When you do this, the program is loaded into memory and then executed, all in one step.

Important! Don't attempt to use commands like LOAD and SAVE to load or save data files you created with an application program. These commands work only on BASIC programs. The application program you're using will tell you how to save and load data.

Cataloging Disks

After you've written and saved several programs on a disk, you may have trouble remembering what you named each of them. If you find that you've forgotten the names of the programs on your disk, type

CAT. You'll see a display like Figure 4-3 that tells you, among other things, the name of the programs on the disk and how much space they take up.

Figure 4-3. A Typical Catalog

```
/MYPROGRAMS

NAME                TYPE   BLOCKS   MODIFIED

PUZZLE              BAS        40   <NO DATE>
AGE                 BAS         1   <NO DATE>
PRACTICE            BAS        11   <NO DATE>
PAZAZZ              BAS        14   <NO DATE>
PENGUIN             BAS         6   <NO DATE>

BLOCKS FREE:    208         BLOCKS USED:    72

]
```

To catalog a disk in the external disk drive, type CAT, D2.

Deleting Programs

In time your disks will accumulate programs that have outlived their usefulness. You can get rid of unwanted programs in order to reuse the disk space by typing **DELETE**, then the name of the program (for example **DELETE PUZZLE**). To **DELETE** a program from a disk in the external disk drive, type **DELETE**, then the name of the program, then a comma, then **D2** (for example, **DELETE PUZZLE, D2**).

ProDOS Commands: You may have noticed that commands that deal with the disk or the disk drive (such as CAT, LOAD, SAVE, and DELETE) are never preceded by line numbers. That's because each of these commands is a ProDOS command, which is executed immediately after you type it.

Creating a Self-Starting Program

Programs that you buy don't require you to type LOAD and RUN. They just start running when you put the program disk in the built-in disk drive and turn on the power.

If you'd like a program you've written to be a self-starter, you can make it self-starting by following these steps:

1. Format a disk (for ProDOS).
2. Copy the files PRODOS and BASIC. SYSTEM from the System Utilities disk onto your formatted disk. (You'll find instructions for copying files later in this manual.)
3. Copy your program onto the disk and give it the name STARTUP.

Starting up this disk loads ProDOS, puts you into BASIC, and runs your program.

It's Your Turn

This section presents two sample programs along with complete explanations of how they work. If you want to try these programs, first start up *Getting Down to BASIC* (this loads ProDOS into memory), then select the Quit option. This puts you in Applesoft BASIC.

Converting Miles to Kilometers

Here's an Applesoft program that converts miles to kilometers.

Program Line	Explanation
10 PRINT "THIS PROGRAM CONVERTS" 20 PRINT "MILES TO KILOMETERS."	Describes what the program does.
30 PRINT "HOW MANY MILES" 40 PRINT "DID YOU TRAVEL";	Prints your request for information. The semicolon instructs the computer to leave the cursor on the current line rather than move it to the next line.
50 INPUT MILE	Puts ? on the screen. Whatever number you type is stored in a variable named MILE. Note that because of the semicolon in line 40, the question mark appears on the same line as the question.
60 LET KILO = MILE/.62137	Creates a variable named KILO, which is equal to MILE (the number you enter) divided by .62137.
70 PRINT "YOU TRAVELED";KILO; 80 PRINT " KILOMETERS."	Prints what's inside the first set of quotation marks, then prints the value of KILO, then prints what's inside the quotation marks in line 80.
90 END	Signals the end of the program.

Once you've typed the program, you can try it by typing

RUN

Here's what you'll see:

```
THIS PROGRAM CONVERTS
MILES TO KILOMETERS.
HOW MANY MILES
DID YOU TRAVEL?3
YOU TRAVELED 4.82804127 KILOMETERS.
```

Spacing? If the spacing on your screen isn't exactly correct, you may have forgotten to type a space inside one of the PRINT statements. To retype a line, type the line number of the line you want to correct, then type the new statement.

You can save this program on your formatted disk or on the *Getting Down to BASIC* disk by typing **SAVE** followed by a name, like KILO. Then, when you want to load the program, simply type **LOAD KILO**.

Write Your Own Conversion Program: You can use PRINT and INPUT statements (and this program as a guide) to write programs to convert any measure you can think of. Try Celsius to Fahrenheit or inches to millimeters.

Crazy Sentences

This program uses INPUT statements to create a crazy sentence. Each time you run the program, the sentence the program creates will be different (unless you type the same responses).

Clear Memory: Before you try another program, clear memory by typing **NEW** and pressing (RETURN).

Program Line	Explanation
`10 PRINT "COLOR";`	Prints a request for a color. The semicolon tells the computer not to go on to the next line.
`20 INPUT C1$`	Displays **?** on the screen. Whatever color you type is stored in the variable C1$ (pronounced "see-one-dollar"). The word *color* cannot be used as a variable name because it's an Applesoft BASIC reserved word.
`30 PRINT "ANOTHER COLOR";`	Prints a request for a second color.
`40 INPUT C2$`	Displays **?** on the screen. Whatever color you type is stored in the variable C2$.
`50 PRINT "NAME";`	Prints a request for a name.
`60 INPUT N1$`	Displays **?** on the screen. Whatever name you type is stored in the variable N1$.
`70 PRINT "ANOTHER NAME";`	Prints a request for a second name.
`80 INPUT N2$`	Displays **?** on the screen. Whatever name you type is stored in the variable N2$.
`90 PRINT`	Prints a blank line.
`100 PRINT "THE";C1$;" ROBOT"`	Prints what's inside the quotation marks
`110 PRINT "WITH THE ";C2$;" EYES"`	interspersed with the colors and names you
`120 PRINT "GRABBED";N1$;" WHILE"`	assigned to the variables.
`130 PRINT N2$;"RAN FOR HELP."`	
`140 END`	Signals the end of the program.

After you type **RUN**, your screen will look something like this:

```
COLOR? GREEN
ANOTHER COLOR? PURPLE
NAME? RAINBOW
ANOTHER NAME? LESLIE ANNE

THE GREEN ROBOT
WITH THE PURPLE EYES
GRABBED RAINBOW WHILE
LESLIE ANNE RAN FOR HELP.
```

You can use this same program to create countless different sentences. In fact, you may even want to write a program that creates a whole story!

Important!

When you choose variable names, be sure that you don't choose a word that is an Applesoft BASIC reserved word. Not even part of a variable name can be a reserved word. For example, a variable can't be named LETTER because the reserved word *LET* is part of the name.

And don't forget the two-character rule: Applesoft BASIC looks at only the first two characters of a variable name. If, in the Crazy Sentence program, the variables were named NAME1$ and NAME2$, Applesoft would have created only one variable.

Printing Your Programs on Paper

If you have a printer connected to your computer, you can print a copy of your program on paper using the LIST command. This is useful in **debugging** programs.

1. Turn on your printer.
2. Type

   `PR#1`

   to direct all information to your printer.

3. Type

   LIST

4. If you're using 40 columns, type

   PR#0

   to turn off your printer and send information back to the screen.

   If you're using 80 columns, type

   PR#3

   instead of **PR#0** to turn off your printer and send information back to the screen.

PR What? PR#1 is shorthand for "print to the device attached to slot 1." Other models of the Apple II have slots inside the case where you plug in peripheral devices. Printers are customarily plugged into slot 1. For compatibility with other models of the Apple II, the Apple IIc understands the same shorthand—even though it doesn't have slots.

You've Only Begun to Program

You know enough now to write simple BASIC programs. To go further you need to learn some programming theory—how to divide your task into logical units before you start writing your program. Many schools offer classes in BASIC, and there are hundreds of elementary books on the subject. Look for a book that stresses the structured approach to programming.

Other Computer Languages

BASIC and Logo are just two of the programming languages available for the Apple IIc. The following list briefly introduces a few other popular computer languages available for the Apple IIc.

- **Pascal:** Named after Blaise Pascal, a 17th century philosopher. This language is used in high school and college computer classes to teach programming because it stresses a systematic approach to programming. You break problems down into tasks and subtasks and then write your program in manageable modules.
- **SuperPILOT (Programmed Inquiry, Learning, or Teaching):** This language is designed so that teachers can create computer lessons without learning all the ins and outs of a full-fledged programming language.
- **6502 Assembly Language:** This language is one small step up from the language of electrical impulses that constitutes the native tongue of the Apple IIc. It's a lot harder to learn than languages like Logo and BASIC, but it gives you faster programs (it doesn't need as much translation), and it gives you more control over the operation of the computer.

Your Apple dealer can tell you how to get the software and manuals for these and other computer languages.

Figure 4-4 shows you how the various computer languages relate to each other, to you, and to the machine.

Figure 4-4. Language Hierarchy

Ready-Made Programs — Data Base, Word Processing, and so on (Application Software)

Where You Start Programming (High-Level Languages)

Pilot

Logo, Pascal, and BASIC

Heavy Technical Programming

Assembly Language

Machine Language

Bits and Bytes
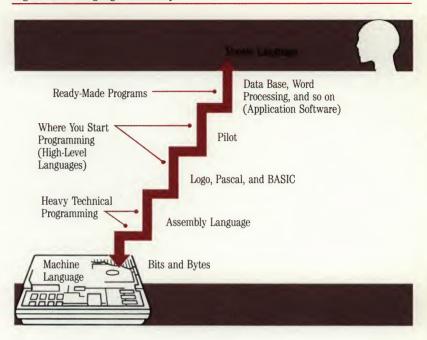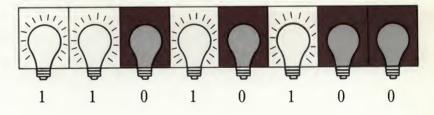
Figure 4-5. Eight Bits in a Byte

Byte

1   1   0   1   0   1   0   0

Bits and Bytes

The computer's brain is made up of switches—like light switches—so everything has to be reduced to on and off before the computer can understand it. On is often represented by the number one. Off is represented by the number zero. It takes a string of eight zeros and ones to express each of the letters, numbers, and punctuation marks on the keyboard. Each zero or one in the string is called a bit. Each string of eight is called a byte. See Figure 4-5.

One reason early computers filled whole rooms is because it took a separate vacuum tube to hold each zero and one. (The

Chapter 4 Summary

Writing a computer program involves breaking a task down into small steps and expressing those steps in terms the computer can understand.

Popular Programming Languages Available for the Apple IIc

Logo	Easy and fun to learn (with lots of emphasis on graphics), yet powerful enough for serious programming. Builds communication skills along with computer literacy.
BASIC	Beginners All-purpose Symbolic Instruction Code is built into the Apple IIc and many other personal computers, so there are lots of people who speak the same language. BASIC is good for beginners because it resembles English and is easy to learn.

Computer As Calculator

Because BASIC is built into the Apple IIc, you can use your computer as a calculator. Here are mathematical symbols the computer understands:

addition	+
subtraction	—
multiplication	*
division	/

ProDOS Commands

CAT	Short for catalog. Displays a list of what's on a disk.
SAVE	Stores your program in a file on a disk.

*story goes that a moth flew into one of those tubes once and shorted out the entire computer. This gave rise to the term **bug**, which now means there's something wrong with your program.)*

Talking this language of zeros and ones gets tedious, so programmers wrote translators (special programs) that allowed them to write instructions in a language more like English, letting the

translators convert the instructions into machine language. Programmers still have to break their tasks down into small, logical steps, but they don't have to reduce the steps to zeros and ones.

LOAD	Transfers a copy of a program on a disk into memory.
DELETE	Removes a program from a disk.

BASIC Commands

NEW	Erases whatever is in memory.
LIST	Displays the program in memory.
RUN	Executes the program in memory.

BASIC Statements

PRINT	Displays information on the screen.
INPUT	Lets you interact with someone using your program.
LET	Defines a variable.
END	Tells the computer the program is finished.
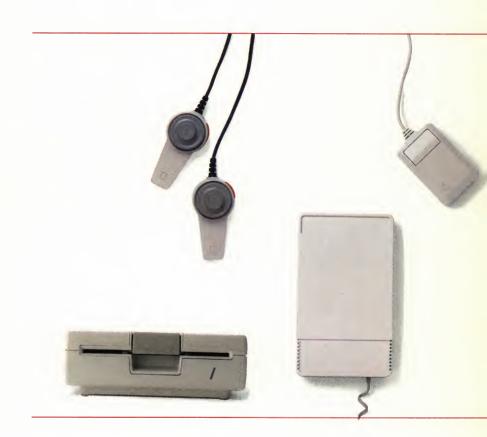
Creating a Self-Starting Program

1. Format a disk for ProDOS.
2. Copy the files ProDOS and BASIC.SYSTEM from your *System Utilities* disk onto your ProDOS-formatted disk.
3. Copy your program onto the disk and name it *STARTUP*.

Now What?

By now you've probably thought of lots of ways you can use the Apple IIc to lighten your workload and free up time for a few forays against the space invaders. The next step is to get some specific application programs (unless you plan to write all of your own programs, in which case you should invest in a good, elementary programming book).

If you want to write letters, term papers, or novels, go out and get a word processing program. If you want to catalog your comic book, butterfly, or coin collection, go out and get a data base program. If you have a task in mind, but don't know the type of application program that can handle it, talk to your dealer. Odds are your dealer can help, because there's an application program for almost every task imaginable—from managing pig farms to tracking hurricanes. Each application program comes with a book that tells you how the program works.

By the Way: The disks packed with the guide are educational software. *The Apple at Work,* for example, teaches you about word processing, data base, and spreadsheet programs, but it can't be used in place of the application program (AppleWorks) it describes.

Choosing Application Programs

Once you've settled on the type of application programs you want, it's a good idea to invest in a **software directory**. Software directories describe individual programs in detail and tell you how much they cost.

Build your software collection gradually, the way you build your book and record libraries. And choose software the way you choose books— on the recommendations of friends. If you don't know many people who use computers, join an Apple users group.

Users Groups

Users groups, also known as computer clubs, are a good place to learn programming short cuts and tricks of the computer trade. There's usually a beginner's group, and there are plenty of old hands to help you learn the ropes.

Ask your dealer for the Apple club nearest you or contact

International Apple Core
908 George Street
Santa Clara, CA 95050
(408) 727-7652

Computer Magazines

Computer magazines are another good source of information about software.

Computer Books

There are also a number of excellent books about computers and computer programming. There are 20 new titles a week, so it's impossible to give you a list of all the computer books on the market. Ask your dealer to recommend some books in your area of interest.

Adding Pieces to Your Computer System

Just as there are all sorts of application programs you can get for your computer, there are dozens of peripheral devices that can make your computer a more powerful machine. Use Table 5-1 to decide which peripheral devices complement the application programs you have in mind.

Important! If a device requires you to plug something into a slot inside the computer, it's designed for other models of the Apple II; *it won't work with the Apple IIc*. Ask your dealer if you have any questions about whether a particular device will work with the Apple IIc.

Table 5-1. Adding Pieces to Your Computer System

Word Processing	Monitor	Printer	External Disk Drive	
Data Base	Monitor	External Disk Drive	Printer *Optional*	Mouse *Optional*
Spreadsheet	Monitor	External Disk Drive	Printer *Optional*	Mouse *Optional*
Education	Color TV or Monitor			
Games	Color TV or Monitor	Hand Controls or Joystick	Mouse *Optional*	
Communication	Monitor	Modem	Printer *Optional*	
Graphics	Color TV or Monitor	Plotter	Mouse *Optional*	
Programming	Monitor or TV *(For elementary programming)*	External Disk Drive *(Necessary for Pascal; optional for BASIC and Logo)*	Printer *Optional*	Mouse *Optional*
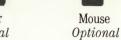
Peripheral Devices

Should you buy a video monitor? Or can you get by with your TV? What about an extra disk drive? This section will answer these questions (and many more) by describing and illustrating the most popular peripheral devices for the Apple IIc.

Monitor or Television Set

Which display device you use with the Apple IIc depends on what you do with your computer. If you use your computer for elementary programming or for playing computer games, you can use your television set (with an **RF modulator**) for a display device. But if you plan to use your computer for word processing, financial planning, or some other business application, a video monitor is a must.

A radio-frequency (RF) modulator makes it possible for a TV set to tune in signals from the computer.

Televisions can't display 80 characters on a line clearly, the way monitors can. They can display only 40 characters on a line. While 40 characters a line is fine for some applications (games and educational programs), it's too narrow for business letters or electronic spreadsheets. Figure 5-1 gives examples of 40-column and 80-column displays.

Figure 5-1a. 40-Column Display Versus 80-Column Display. This is a 40-column display.

```
File: holiday          REVIEW/ADD/CHANGE
========================================

Dear Pat and Dick,

Sure is good to be writing you again. I
can't believe it's been a year!

About the biggest news here is that we
bought an Apple computer. In fact, I'm
using it right now to write you this
letter. And you know if butter fingers
me can get it to work, it's got to be
easy to use!

                         Love,

                         Harry and Nan
```

Figure 5-1b. 40-Column Display Versus 80-Column Display. This is an 80-column display.

```
File: holiday                REVIEW/ADD/CHANGE              Escape: Main Menu
===============================================================================
Dear Pat and Dick,

Sure is good to be writing you again. I can't believe it's been a year!

About the biggest news here is that we bought an Apple computer. In
fact, I'm using it right now to write you this letter. And you know if
butter fingers me can get it to work, it's got to be easy to use!

Nan and the kids are doing fine. Nan's been writing a lot of articles and
I'm still killing myself at the office. In my "spare" time I'm managing
Jimmy's ball team and let me tell you, those kids are GOOD.

How are your kids, by the way?  I'd really like to hear from you. Why not
buy a computer? It makes letter writing a breeze. Anyway, happy new
year and do keep in touch.


                                    Love,

                                    Harry and Nan
```

Monochrome video monitors come in three varieties: black and white, black and green, and black and amber. If you need or want a sharp, clear picture and color, you might want to look into a color monitor. Color monitors cost more than monochrome monitors, but they're ideal for computer graphics and for displaying business charts and graphs.

If you alternate between using a monitor and a television, make sure to set the 80/40 Column switch before starting up the program. The switch must be set to 40 columns (down) for TV and can be set to 80 columns (up) or 40 columns (down) for monitor. If you discover that the switch is set incorrectly after starting a program, it's no big deal. Just change the setting and restart the computer.

For how to restart the computer, see "Starting Up With the Power On" in Chapter 1.

40 or 80 Columns: Some programs are written in the 40-column format and will appear in the 40-column format even if you have the 80/40 Column switch set to 80 columns. Other programs are designed exclusively for the 80-column format and won't function properly if the switch is set to 40. In other words, you can't use such programs if a television set is your only display device.

Finally, some people prefer the 40-column display for some programs even though they have a monitor and could display the program in the 80-column format. Experiment with the switch and you'll quickly discover your options and preferences.

Figure 5-2. The Apple Imagewriter and Scribe

With serial printers, the computer sends information to the printer one bit at a time (it takes eight bits to make a byte, or one character). The computer sends parallel printers information eight bits at a time.

Printer

A printer creates a paper copy of information you create with your computer. You can use a computer without a printer, but it's not convenient or practical, for example, to mail your letters on disks. For some people, a printer is a must.

Printers come in a variety of prices and vary in print speed, quality, and loudness. Ask your dealer for a demonstration before you buy. Printers also vary in degree of compatibility with your computer. Make sure the printer you buy works with the Apple IIc—get a demonstration with the programs you'll be using—before you bring it home.

Make Sure It's Serial: The Apple IIc is designed to work only with serial printers. You can't use a parallel printer.

Figure 5-2 shows two types of printers you can connect to your Apple IIc: the Apple Imagewriter and the Apple Scribe®.

The Imagewriter is a dot matrix printer. Dot matrix printers form characters with patterns of dots. They're fast, affordable, and ideal for graphics. They're fine for personal letters and memos. The main advantage of dot matrix printers is that you can use a wide variety of typefaces and type sizes.

The Scribe is a thermal transfer printer, which means that letters are essentially *burned* on paper. Thermal printers are quiet and cheap. The Scribe can print in four colors (with the optional color ribbon), and, unlike other thermal transfer printers, it does not require special paper.

Important!

Before using a printer with the computer, be sure to read the section on configuring serial ports in the utilities section of this book.

If you alternate between plotter and printer in port 1, make sure the power is off before you make the switch.

Figure 5-3. The Apple Color Plotter

Plotter

Plotters can reproduce graphs, charts, floor plans, and other graphics you create with your computer. Figure 5-3 shows you the Apple Color Plotter.

Make sure the plotter you choose has a serial interface like the Apple Color Plotter.

Second Disk Drive

A disk drive is an indispensible part of your computer system—that's why one is built into your Apple IIc. It's convenient to have a second disk drive so that you can keep your application program disk in the built-in disk drive (drive 1) and your data disk in drive 2. (A few programs require you to have two disk drives.)

Figure 5-4. Disk Drive

Having two disk drives also makes it easier to make copies of data disks—a must, since disks are perishable. Figure 5-4 shows you a disk drive you can attach to your Apple IIc.

Mouse

So far you've been communicating with the computer through the keyboard. Some programs also let you communicate with the computer by using the mouse (see Figure 5-5). Rolling the mouse across your table or desk moves a pointer on the screen. With some programs, you can use the mouse to draw pictures. With other programs, you can use the mouse to select topics from a menu (move the pointer to the topic you want and press the mouse button).

Figure 5-5. The Apple Mouse

Figure 5-6. Modem

Modem

A modem, short for modulator/demodulator, links your computer by telephone to other computers and information services. If you plan to tap into a large computer library for stock quotes, medical or legal research, or use your computer for electronic banking, you'll need a modem and a communications program like Apple Access II.

Different modems send and receive information at different speeds. The speed is measured in bits per second (bps), often referred to as baud. The most common baud rate is 300. You can also get modems for the Apple IIc that send and receive data at 1200 baud. They cost more, but they're four times faster—a valid consideration because you're often paying long distance phone rates. (Some programs can't handle 1200 baud, so make sure your program can cope with the higher speed before you buy the 1200 baud modem.) Figure 5-6 shows a popular modem you can attach to your Apple IIc.

Figure 5-7. Hand Controls and Joystick

Joystick or Hand Controls

If you plan to use your computer for games—and who doesn't occasionally—you'll want to invest in a joystick or hand controls. Not all games require a joystick or hand controls, but the vast majority do.

Hand controls and joysticks control the movement of creatures or objects in game programs. With hand controls, you control movement by turning a pair of knobs—one in each hand; with a joystick, you maneuver an airplane-style joystick. Both hand controls and joysticks have buttons you press to fire torpedos, throw forward passes, or anything else the programmer can dream up. Figure 5-7 shows you what the hand controls and joystick look like.

You're Not Alone

As you build your software library and add peripheral devices to your computer system, you'll occasionally hit stumbling blocks. Where can you turn? This book is a good place to start. If you can't find the

answer here, talk to your dealer. Your dealer is the best source of information on the Apple II family of computers. And don't stop there—let us know what the question or problem was by filling out the Tell Apple card at the back of this guide.

You Can Take It With You

The Apple IIc is a portable computer—you can carry it with you from home to work and back again. And this is a portable owner's guide. You can carry the lessons you've learned into every session at the computer. And you can return to the guide for refresher courses any time you need them.

Now that you've finished the guide, the next step is to

- get an application program and read the manual that came with it, or
- get a book and learn programming.

Whether you decide to write your own programs or use application programs, you'll need to know how to format disks and how to make copies of disks. These and other utilities are explained in the second part of this book. Some application programs have utilities—like copying, deleting, and formatting—built in. So you might want to check the manual that came with the application program and follow the instructions there.

From here on out, the best teacher is experience. You won't really know what you know, or what you don't know, until you've written your first program or composed your first letter with a word processing program. Your most unforgettable lessons will come from trial and error. Don't hesitate to ask friends for help, or to offer help when experience has turned you into a veteran. That's what it's all about—getting personal about computers.

Thanks for your time. Enjoy your computer.

Chapter 5 Summary

Popular Peripheral Devices

Display Device	A video monitor or television set. It displays instructions from the program to you, and shows you what you've typed into memory.
Printer	Produces a paper copy of information you create with the computer.
Plotter	Draws a paper copy of the graphics you create with the computer.
Disk Drive	Writes information on disks and reads information from disks.
Mouse	Moves a marker across the screen in some programs.
Modem	Links your computer to other computers and information services by phone.
Joystick and Hand Controls	Move objects and creatures around the screen.

Where to Go for Help and Information

- Users groups
- Software catalogs
- Computer books and magazines

Appendix A

Ask Apple

Now that you've spent some time with the Apple IIc, you probably have lots of questions that never occurred to you before you actually tried out a computer. In this section, the questions new Apple users frequently ask are answered. If you have other questions, ask your dealer, people at an Apple users group, or send your inquiry to one of the Apple magazines.

Can I run all Apple II and Apple IIe software on my Apple IIc?

Yes, you can run the overwhelming majority of Apple II and Apple IIe software. You can't use software that requires more than two disk drives or software the requires a peripheral card. The Apple IIc has no slots, so it can't run software that uses devices that must be connected through cards in slots. It also can't run software that uses early DOS (3.1, 3.2).

Can I run software for other computers on the Apple IIc?

The software that runs on the Apple IIc is software that uses one of Apple's operating systems: ProDOS, DOS, or Pascal. Software written for other computers doesn't use these operating systems and consequently won't work on the Apple. You will find, however, that almost all major software publishers have versions of software that run on the Apple IIc.

Sometimes I hear horror stories about people typing pages and pages of information and then having it disappear. How can I prevent this from happening to me?

Save! Save! Save! Every program has a way for you to transfer information from the computer's memory to a file on a disk. Once stored on a disk, information is safe, or at least a lot safer than it is when it's only in your computer's memory. That's because information stays in memory only as long as the power is on and the computer is working properly. Power surges, electrical failures, computer failures, and klutzy friends who trip over power cords are rare, but they invariably happen just after you've written your cleverest program or most heartfelt letter. By saving frequently to a disk (at least every 10 minutes) you're guaranteed that, no matter what, you won't lose too much valuable information. But saving to a disk is only half the secret. At the end of the day, always make a backup copy of your disk. No matter how careful you are, disks get damaged. The only way to guard against a damaged disk is to have a spare copy.

Can software break?

Yes, sometimes software just doesn't work the way it's supposed to. But then again, sometimes hardware doesn't work the way it's supposed to, and still other times, users don't work the way they're supposed to. What this means is that, although software may appear broken, the problem often is with hardware or, believe it or not, the user. If you think your software is broken, try reading the manual. It's possible that the software is meant to work the way it's working. If, after reading the manual, you still think the software is not working correctly, do a repeat test: Note the error and then follow the same sequence of steps to see if you can get the error to happen again. Assuming it does, your next task is to figure out whether the problem's with a piece of hardware, such as the computer or disk drive, or with the software. Try running other programs on your computer. If they also don't work properly, chances are that hardware is the problem. If you try running the broken software on your dealer's computer and have the same problem, you probably have a real software bug on your hands. Once you've caught a bug, report it to your dealer. He may have a patch (a corrected piece of software), or he may be able to help you work around the problem. If your dealer can't help, contact the software publisher directly; many have toll-free telephone numbers.

How much do I need to know about operating systems?

Unless you're planning on some heavy-duty programming, using a general utilities disk is the closest you need to get to an operating system. If, on the other hand, you've decided that programming is for you, you'll probably need more in-depth knowledge. If you'll be doing BASIC programming, read *BASIC Programming With ProDOS* and the *ProDOS Technical Reference Manual.* Some BASIC programmers may want to write programs using DOS, the operating system Apple used before ProDOS. If you want to write DOS programs, you'll need to purchase the *DOS User's Kit.* Finally, if you want to write Pascal programs, you'll need the Pascal operating system and the accompanying manual. Logo uses the ProDOS operating system; the Logo manuals explain how to use ProDOS with Logo.

What's booting?

In computer lingo, *booting* means starting up your computer. When you turn on the power, a built-in program (the Monitor program) is put into memory, where it turns on the disk drive. The disk drive then

tranfers the startup program on the disk to the computer's memory. All this must happen before the computer is ready to work. So, quite literally, booting is letting the computer pull itself up by its own bootstraps, which is how the term originated.

Is my Apple very fragile? I keep thinking I'm going to break it.

Your Apple is about as fragile as your television set or stereo. You will never break your Apple by pressing the wrong keys, just as you won't break your TV by turning to the wrong channel.

Are disks fragile?

Yes, believe it or not, disks are a lot more susceptible to damage than your computer. In fact, damaged disks are probably the greatest cause of what people think is a broken computer or broken software. Dust is a disk's greatest enemy. To guard against it, always keep disks in their envelopes. Also, keep disks away from extreme heat, sunlight, liquids, and anything that contains a magnet, like a telephone. It's best to store disks in a disk holder. (If you don't have a special disk holder, a shoe box works fine.) Finally, when preparing disk labels, write them first, then stick them on the disk. If you must write on a label that's already on a disk, make sure you use a felt-tip pen, rather than a ball-point pen. Using a pencil or ball-point pen could dent the surface of the disk.

Is it OK to use both sides of a disk?

Not usually. The disks that are part of the guide are specially made for two-sided use.

Do I need an external disk drive?

No, you can use almost all software with one disk drive. A second disk drive just makes using your computer a little easier. The time when a second drive comes in most handy is when you're making backup copies of disks. If you copy a disk using only one disk drive, you have to do a lot of swapping—that is, swapping your original and backup disks in and out of the built-in disk drive. If you have an external disk drive, you can put your original disk in one drive, your backup in the other, press a few keys, and then let your computer do the work.

How much electricity does my Apple use?

Your Apple IIc system, complete with monitor, uses less electricity than a 100-watt light bulb.

Should I turn off my Apple after using it?

If you're going to be away for more than an hour or two, it's a good idea to turn off your computer, just so you don't waste electricity. If you're just taking a stretch or grabbing a drink, leave your Apple on (but save what you're working on before you get up).

Do you recommend opening up the Apple IIc so I can see how it works?

Absolutely not. First of all, opening up your Apple IIc voids your warranty. Second, your computer's innards aren't much more interesting than your toaster's. If you want to learn how the Apple IIc works, start up *The Inside Story* disk. It gives you some idea of what the inside of the computer looks like and what its parts do. Apple IIe and II Plus owners need to open their computers to attach peripherals, like printers and modems. The Apple IIc lets you connect peripherals without opening it up.

Do I need a power surge protector to make sure my computer doesn't blow up?

First of all, computer blow-ups and smoke-outs are things of the past. Today, about the most dramatic result of a power surge or electrical storm is lost data. Even losing data is extremely rare, however, since your computer has a built-in mechanism to guard against changes in electrical power. The only people who may want to invest in a protector are those who are extremely cautious and those who live in areas that are particularly prone to electrical storms, hurricanes, and electrical failures.

Do I need to touch type to use a computer?

No, you don't need to know how to touch type. Lots of people who use the hunt-and-peck method (that is, they hunt for each key as they need it) do just fine. In fact, hunt-and-peckers report greatly increased typing speeds after a few days with a computer. If you want to learn to touch type, you may want to buy a typing program. These programs give you typing instructions right on the screen.

How do I know whether to set the Apple IIc display to 40 or 80 columns?

If you're using a television, set the Apple IIc display to 40 columns. That's because televisions don't have fine enough resolution to display 80 columns worth of information. If you're using a monitor, set the Apple IIc 80/40 Column switch to 80 columns. Many application programs, particularly word processing and spreadsheet programs, require an 80-column display.

What's K and how much do I need?

To understand what a K or kilobyte is, you first need to know what a byte is. A byte is the space one letter or digit takes up in the computer's memory. A kilobyte is equal to 1024 bytes. That means that a computer with 128K, like the Apple IIc, can store a little more than 128,000 characters in its memory. The more kilobytes your computer has, the more information it can store and the larger the programs it can run. 128K is enough memory for just about all home and business applications.

Is it bad for your eyes to look at the screen for too long?

We don't know of any studies that have found that staring at a monitor is harmful to your eyes. Some people do, however, report getting headaches or eye strain after lengthy tête-à-têtes with their computer. Current thinking is that these symptoms are caused by sitting in the same position for long periods rather than from the way information is displayed. In any event, it's a good idea to get up and stretch, just to give your eyes a rest and your body a chance to get moving.

How did Apple get its name?

The name *Apple Computer* was chosen late one afternoon as Steve Jobs and Steve Wozniak, Apple's founders, faced the deadline for filing a Fictitious Name Statement, part of the business licensing procedures. After volleying names back and forth with Wozniak for hours, Jobs looked at the apple he was eating and decided that, unless he or Woz arrived at something better by five o'clock, they would call the company Apple. Five o'clock came and went; Apple was the new company's name.

Is there such a thing as the Apple I?

Yes. The Apple I was the first computer that Steve Jobs and Steve Wozniak created. The computer had no case, and you had to purchase your own keyboard. There were no disk drives back then, so all programs had to be stored on cassette tape. Really, though, the Apple I was the most user friendly computer of its day since it required only a minimum of time and technical know-how to put it together. About 200 Apple I's were built. The computer was designed at night in a lab at Hewlett-Packard and manufactured in the garage of Steve Jobs' parents. Unless you're a collector, the Apple I isn't much of a bargain; the computer sells for between $10,000 and $15,000.
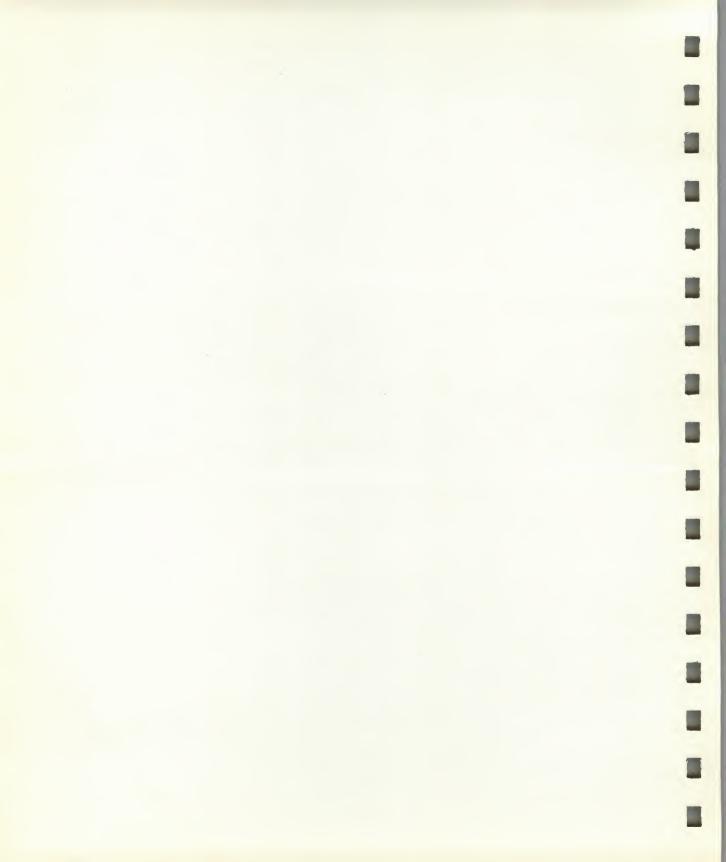
Did the Apple I have a manual?

You bet. It was about eight pages long.

Who designed the Apple logo?

The Apple logo was designed by Regis McKenna, a Silicon Valley public relations firm. The original Apple logo was a design of Newton under an Apple tree. But Newton didn't lend himself to reproduction, so Regis McKenna was called in to create an insignia that could be replicated more easily.

Should I worry if I find myself talking to my Apple IIc?

No. Lots of people talk to their computers, especially when they're just learning to use them. What's nice about the current crop of computers is that they can't understand what you're saying. In a decade or so, you may have to watch your language.

Appendix B   Troubleshooting

Making mistakes is part of the learning process. In fact, if you don't make a few mistakes, you're not being very adventurous, and you're probably typing too slowly. So don't be afraid of a few beeps and blinking error messages. It comes with the territory.

Symptom	Cause	Remedy
SYNTAX ERROR on the screen.	Some programs require all your entries to be in uppercase. You typed something in lowercase, or the program doesn't recognize the command or instruction you typed; maybe it's misspelled.	Press (CAPS LOCK) down and type your entry again. Check your typing. If you made a mistake, retype the command.
I/O ERROR on the screen.	You put the wrong disk in the disk drive, probably a blank (unformatted) one, or there's a poor connection between your computer and your printer or external disk drive.	Take the disk out of the disk drive and see if it's the one you thought it was. If it's not, replace it, and repeat what you were doing when you got the error message. Check to make sure your printer and disk drive are securely plugged into the computer.
Nothing happens when you turn on the power. (The built-in disk drive doesn't make a sound.)	The power cord isn't plugged into the wall or into the computer.	Turn the power switch off, then make sure the power cord is plugged into a power source and plugged into the computer. Then try again.
Nothing appears on the screen when you turn on the power (even though the Disk Use light comes on and you hear a whirring sound from the disk drive).	The monitor isn't turned on, the monitor isn't plugged in, or monitor contrast or brightness isn't adjusted properly.	Turn on the monitor. Plug in the monitor. Adjust the monitor contrast or brightness knob.
CHECK DISK DRIVE appears on the screen.	There's no disk in the built-in disk drive, or the disk in the built-in disk drive isn't formatted.	Put a program disk in the built-in disk drive and repeat the startup procedure.

Symptom	Cause	Remedy
Blurry screen image with very tiny letters.	You are using a television set for a display device and the 80/40 Column switch above the keyboard is set to 80 (the monitor setting).	Change the 80/40 Column switch to 40 (down) and start up again.
Blurry 80-column display on a television set, even though the 80/40 Column switch is set to 40.	Some Apple IIe application programs don't check the 80/40 Column switch setting and assume that you want 80 columns.	Use a monitor (if available) or get software designed for the Apple IIc.
Screen is only half filled with characters.	You are using a monitor for a display device and the 80/40 Column switch above the keyboard is set to 80 (the television setting) and the program is written for 40 columns.	Change the 80/40 Column switch to 40 (up) and start up again.
Scrambled Text (characters run off the edge of screen).	Your 80/40 Column switch is set to 40 (down) and the program is designed for 80 columns.	If you have a monitor, set the 80/40 column switch to 80 (up) and start again.
Unusual characters on the screen when you start up an application program designed for earlier models of the Apple II.	The application program is trying to use memory space now reserved for mouse firmware.	Use the application program on an Apple IIe (if available) or get software designed for the Apple IIc.
Screen image is too bright or too dim.	Monitor contrast or brightness isn't set properly.	Adjust the monitor contrast or brightness knob until the display is easy to read.
Sound is too low or too loud.	The speaker volume isn't set properly.	Adjust the speaker volume control on the lower left side of the Apple IIc until the sound is set to a comfortable level for you (and those around you).
Program disk won't start up; disk drive keeps whirring.	Disk is bad.	Press (CONTROL)-(RESET) to stop disk drive. Contact the dealer or manufacturer.

Symptom	Cause	Remedy
Program disk won't start up.	Built-in disk drive needs to be aligned or adjusted.	Have your dealer adjust the disk drive. In the meantime, you can start up the disk from the external disk drive (if you have one) by following these steps: 1. Put the program disk in the external disk drive. 2. Hold down (CONTROL) while you press (RESET). 3. When you see], type PR#7 and then press (RETURN).
Information not recording on the disk; unable to load previously saved information; unable to catalog data disk.	Disk is not being settled properly in the disk drive.	When you insert a disk into the drive, be sure that it is settled into place. Close the door completely. See "Verify that a Disk Is Readable" in Chapter 2 of the *System Utilities* section.

General Troubleshooting Tips

Specific application programs have their own set of error messages. The messages are either self-explanatory or explained in the manual that came with the application program.

Some programs are better than others at shielding you from disaster. And some programs are friendlier than others when it comes to error messages. Friendly programs will tell you what you did wrong and how to fix it. Unfriendly programs will beep and display a cryptic message. If you run into an unfriendly program that doesn't tell you what to do about your mistake, try these remedies:

- Check your typing.
- Press (CAPS-LOCK) down. (Some programs accept entries only in uppercase.)

- Check the manual to see if you did the procedure correctly.
- Get help from someone who knows how to use the program.
- Get help from your dealer.

Stopping a Runaway Program

Most programs give you an easy way out. If your program doesn't have a Quit option on the menu, try these escape methods (until you find the one that works):

- Type **Q** for Quit.
- Press (ESC).
- Hold down (CONTROL) while you press (C).
- Press (CONTROL)-(C) and then (RETURN).
- Hold down (CONTROL) while you press (RESET).
- Hold down (⌂) and (CONTROL) while you press (RESET).
- Turn off the power.

Programs That Won't Start Automatically

If you put one of your own disks in the built-in disk drive, start it up, and find yourself staring at a blank screen, try this:

Type **CATALOG** and press (RETURN).

CATALOG is a special word, or command, that tells the computer to produce a list of what's on the disk. If this command produces a list of programs like the one in Figure B-1, you can run any of the programs with the letter *A* in front of them by typing **RUN**, the name of the program, and then (RETURN). For example, you might type **RUN BINGO** and then press (RETURN). You can run some of the programs with the letter *B* in front of them by typing **BRUN**, the name of the program, and then (RETURN). For example, you might type **BRUN BOZO** and then press (RETURN).

You're most apt to run into this situation if you're using programs written by friends. Most packaged programs start by displaying a menu or a set of instructions.

Figure B-1.A Typical Catalog

```
DISK VOLUME 254

 A 006 HELLO
 A 031 GO FISH
 A 040 GUNNY SACK
 A 060 SPACE OUT
 A 045 BINGO
 B 039 BOZO

]
```

Appendix C

Apple II Family Differences

There are thousands of programs for the Apple II family of computers. You can use most of them on the Apple IIc if you take into account

Table C-1. Apple II System Differences

	Memory	Keyboard	Micro-processor	Peripheral Device Interface	
Apple II Plus	48K Expandable to 64K with language card in slot 0.	51 Keys Uppercase Only.	6502	8 Slots (For peripheral device interface cards.)	Recommended Slots Slot 0 Language Card Slot 1 Printer Slot 2 Modem Slot 3 80-Column Slot 4 Other Device Slot 5 Other Device Slot 6 Disk Drive Slot 7 Co-processor
Apple IIe	64K Expandable to 128K and beyond with memory card.	63 Keys Uppercase and Lowercase.	65C02 (Late Model) 6502A (Early Model)	8 Slots (For peripheral device interface cards.)	Recommended Slots Slot 1 Printer Slot 2 Modem Slot 3 Leave empty if you have a card in Aux. Connector. Slot 4 Mouse Slot 5 ProFile Slot 6 Disk Drive Slot 7 Co-processor Aux. Conn. Extended 80-Column Card
Apple IIc	128K Not expandable.	63 Keys Uppercase and Lowercase. Dvorak Option.	65C02	6 Ports (Interfaces for most popular peripherals are built into computer.)	Icons Ports Joystick/Mouse/ Hand Controls Modem RF Modulator (for TV) Monitor External Disk Drive Serial Printer

the differences between the Apple IIc and the rest of the Apple II family. These differences are summarized in Table C-1.

Hardware Differences				Languages in ROM	Operating Systems
120 Chips	Open System (Can accommodate a wide range of devices and co-processors.)	V-shaped Openings (Accommodate a variety of cable clamps.)	Additional Features ■ Tape Recorder I/O ■ Slots for Peripherals ■ Built-in Speaker	Applesoft BASIC	DOS 3.2 DOS 3.3 ProDOS CP/M (with Card) Pascal
31 Chips Fewer chips means greater reliability, cooler system, supports MouseText.	Open System (Can accommodate a wide range of devices and co-processors.)	Rectangular Openings (Sized for standard DB-style connectors.)	Additional Features ■ Tape Recorder I/O ■ Slots for Peripherals ■ Built-in Speaker	Applesoft BASIC	DOS 3.3 ProDOS CP/M (with Card) Pascal MS-DOS (with Card)
38 Chips Fewer chips means greater reliability, cooler system, supports MouseText.	Closed System (Can accommodate serial devices and standard peripherals.)	Ports (For connecting peripheral cables.)	Additional Features ■ Built-in Disk Drive ■ 80/40-Column Switch ■ Language Switch (for Dvorak) ■ Volume Controls	Applesoft BASIC	DOS 3.3 ProDOS Pascal

Memory Capacity

The Apple IIc has 128K (or 131,072 bytes of **RAM, random-access memory**)—twice the memory capacity of the standard Apple IIe. This means the Apple IIc has the memory capacity to run all software designed for other models of the Apple II, but other Apple II's may not be able to run software designed for the Apple IIc.

Additional Features

The Apple IIc has built-in interfaces for peripheral devices. These are called ports. The Apple IIe has slots for peripheral cards.

A peripheral card is a printed circuit board (similar to the main logic board, only smaller).

The Apple IIc has built-in 80-column capability, a built-in disk drive, and a built-in connector for one additional disk drive. It also has connectors for a serial printer, plotter, or modem. These built-in connectors are called **ports**.

Other models of the Apple II have slots, long narrow connectors, inside the computer where **peripheral cards** are plugged in to connect disk drives, printers, and other devices to your computer. Printers are generally connected through a card in slot 1, modems through slot 2, disk drives through a disk controller card in slot 6.

Programs written for other Apple II's often ask for the slot number of your printer or disk drive. The Apple IIc doesn't have slots, but you can use these programs by supplying the slot number that corresponds to your printer, modem, or disk drive port:

Device in Port 1	Slot 1
Device in Port 2	Slot 2
Built-in Disk Drive	Slot 6, Drive 1
External Disk Drive	Slot 6, Drive 2

Because other models of the Apple II don't have built-in disk drives, programs and manuals written for those models distinguish between the startup drive and other drives by number. The startup drive is drive 1.

The controller card that connects disk drives to the computer on earlier Apple II's can accommodate two disk drives. Programs distinguish between the two drives connected through slot 6 by drive number.

Starting From Drive 2: If you ever have trouble starting up a program from the built-in disk drive, you can start a program from the external drive, drive 2, by following these steps:

1. Put the program disk in the external drive.
2. Hold down (CONTROL) while you press (RESET). (This turns off the built-in disk drive.)
3. Type **PR#7** and press (RETURN). (This turns on the external disk drive, drive 2.)

(This procedure works only for ProDOS-based programs.)

Some printers designed for other models of the Apple II require you to set certain switches on the card that plugs into the computer. The printer interface is built into the Apple IIc, so you can't set the switches manually, but you can do the equivalent using a program descibed in the utilities section of this book.
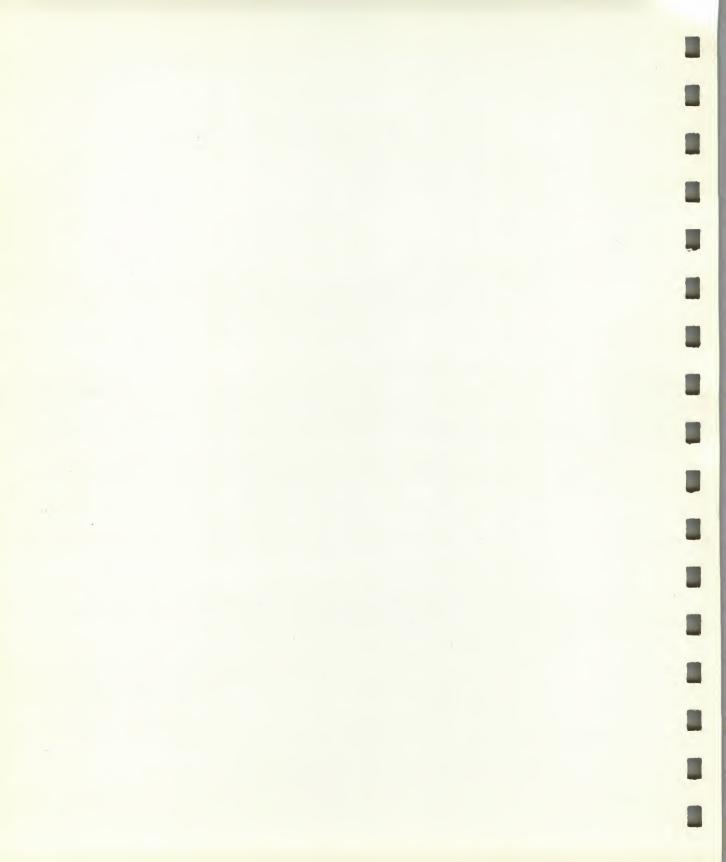
Keyboard

You couldn't type lowercase letters on the Apple II and Apple II Plus, so programs written for those machines only recognize uppercase letters. Those programs will run on your Apple IIc when you press down (CAPS LOCK).

The Apple IIc keyboard is exactly the same as the Apple IIe keyboard except for the location of (RESET), so you should have no problem using Apple IIe programs on the Apple IIc. But both the Apple IIc and the Apple IIe have some keys that the Apple II and Apple II Plus didn't have ((ö), (é), (↑), and (↓)). Older programs haven't taken advantage of these keys, but you can still run the older programs on your Apple IIc.

The Apple II and Apple II Plus have a REPT key that you could press down to make other characters repeat. The Apple IIc and Apple IIe keys repeat automatically if you hold them down.

Appendix D

Apple IIc Specifications

Standard Features

- 65C02 eight-bit microprocessor
- 128K bytes of RAM
- 16K bytes of ROM
- Applesoft BASIC in ROM
- Disassembler and machine language Monitor program in ROM
- Built-in disk drive with controller for second disk drive (slot 6 equivalent in Apple IIe)
- 80-column display (built-in AUXILIARY slot equivalent in Apple IIe)
- Built-in uppercase and lowercase character display
- 63-key keyboard
- Built-in speaker with volume control
- Hand control/joystick/mouse capability
- Built-in serial interface for printer (slot 1 equivalent in Apple IIe)
- Built-in serial interface for telephone modem (slot 2 equivalent in Apple IIe)
- Color graphics capability
- 12-volt internal power supply
- Power transformer in power cord

Languages Available From Apple

- Applesoft BASIC (built in)
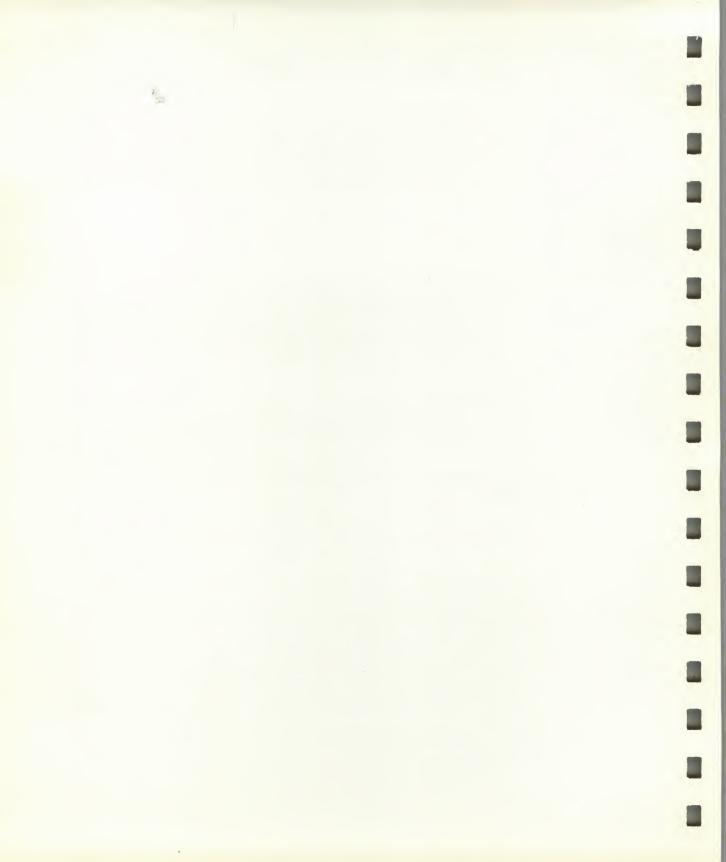- Pascal
- FORTRAN
- SuperPILOT
- Logo
- 6502 Assembly Language

Operating Systems Available

- ProDOS
- DOS 3.3
- Pascal

Popular Accessories

- Mouse
- Color or monochrome monitor
- 5 1/4-inch disk drive
- Printer
- Telephone modem
- Hand controls, joystick
- Color plotter
- RF modulator

For technical information, see the *Apple IIc Reference Manual.*

To help you maximize the performance you'll get from your system, Apple Computer, Inc. has established a worldwide network of full-support dealers. Your local dealer has a complete package of services to offer you. Each has an Authorized Service Center with specially trained technicians. Each center is equipped with the latest diagnostic programs and an inventory of replacement parts so you'll get fast and efficient service.

If you need answers to technical questions or information about product updates, your full-support dealer can help you. Apple's Technical Support organization backs each dealership to assure prompt, reliable assistance.

Service

If service is required, you should take the system (or Apple product) to your dealer. If you have moved, take it to the nearest Authorized Service Center.

There are more than 2100 Authorized Service Centers throughout the world. For the location nearest you, call (800) 538-9696 in the United States or write

Apple Computer, Inc.
Attn: Customer Relations
20525 Mariani Avenue
Cupertino, CA 95014

During the initial warranty period, your dealer will repair or replace, at no charge, any Apple-manufactured product that proves to be defective. Apple also offers the AppleCare[SM] Carry-in Service Agreement, which will keep this same protection in force for an additional year. This coverage is available through your full-support dealer. (See ''AppleCare'' for information.)

Support

Become thoroughly familiar with your manuals; then if you still have questions, call on your dealer for assistance.

If you have a question that your dealer is unable to answer, ask him to refer the question to Apple Technical Support. Apple Technical Support provides your dealer with Technical Notes, which answer commonly asked questions, and access to technical support specialists.

Your dealer has the latest information on new hardware and software products and will keep you informed about any product updates. If you want to upgrade your system, your dealer can help you select compatible components.

For service and support, look to your full-support dealer!

AppleCare

When you first purchase your Apple computer, you are protected by a 90-day warranty. So you don't pay for parts or labor if a repair is needed; there are no unanticipated service expenses. You can add an additional year to this protection with our fixed-cost, carry-in service plan—AppleCare. It combines convenient service with fast turn-around.

AppleCare Carry-In Service is the lowest-priced service package in the industry. And your AppleCare agreement will be honored at all Apple Authorized Service Centers within the country of purchase—added insurance should you relocate. Local service means time saved in getting your Apple back to work. Ask your Apple dealer for details.

You may purchase AppleCare at any time. But for uninterrupted protection, it's a good idea to buy it along with your system. Besides providing you with the most complete coverage, purchase with your system avoids an owner-paid dealer inspection of your system if your 90-day warranty has expired.

AppleCare is available through your Apple dealer. Protect your Apple—ask for AppleCare.

System Utilities

Contents

Chapter 1   Introduction

This book explains how to use the *System Utilities* disk that came with your Apple IIc. You should read the first part of this book, the *Apple Presents the Apple IIc: An Interactive Owner's Guide* before you read this part.

Utilities is a word you probably associate with water, gas, and electric services. Well, just as home utilities keep your home operating efficiently, system utilities keep your computer operating efficiently.

System is short for computer system, which refers to your computer and all its peripheral devices.

System Utilities is a set of programs that give you control over the information you save on disks. (Which is pretty vital, when you consider all the vital information people entrust to disks: term papers, tax records, novels, financial models, programs.)

One of the most important things the utilities disk does for you is prepare, or **format**, your data disks. When you format a disk, the utility divides the magnetic surface of the disk into sections where information can be stored in files. Formatting is an important utility because you can't save anything on a disk until it has been prepared. Other utilities let you copy disks and individual files, check which files are on a disk, and erase files from disks so you can reuse the disk space.

A file is a collection of information stored on a disk. If you're unfamiliar with this term or others in this book, refer to the interactive owner's guide.

Mastering these utilities is a giant step toward computer confidence. You won't have to worry about losing valuable information because you'll have backup copies of all your important disks. And you won't have to keep a handwritten record of what's on a disk because you'll know how to check its contents.

While the utilities disk is an invaluable part of your software library, it is not a substitute for application programs. You can't use it to write letters or prepare budgets. But you must use it to format disks that receive your letters and budgets, and once you have those letters safely stowed in files on disks, you can use the utilities disk to copy them, delete them, rename them, and otherwise organize them.

Some Applications Include Utilities: Some application programs have formatting and other utilities built in. When this is the case, go ahead and use the utilities on your application disk.

Configuring the Serial Ports: Another important part of the utilities disk lets you adapt the ports on the back of the Apple IIc for printers, plotters, or modems that don't work automatically with the Apple IIc. How to do this is explained in Chapter 4.

Experienced Users: The utilities disk works on Pascal, DOS 3.3, and ProDOS disks. It incorporates utilities and conversion functions from the DOS 3.3 *System Master* disk and most of the Pascal Filer and ProDOS utility functions.

Using the Utilities Disk

The best way to learn how to use *System Utilities* is by experience. In the next few pages, you'll get a step-by-step, guided tour through one of the most valuable utilities—Duplicate a Disk. This utility allows you to copy important disks in your software library so you'll have a backup in case something happens to the original.

These are among the only step by step instructions in this guide. The reason is simple—you won't need written instructions to use the *System Utilities* disk. Everything you need to know or do is spelled out on the screen. Just choose the utility you want and follow the instructions. If those instructions aren't enough, read the general instructions in Chapter 2.

Hands-On Introduction to Utilities

Don't just read about duplicating a disk, do it! Follow these instructions and make a backup copy of *System Utilities*.

For more on flexible disks, review the interactive owner's guide.

Before you can make a copy of the utilities disk, you need a blank disk. If you don't have any blank disks, go out and get a box at your local computer store. The Apple IIc uses 5 1/4-inch, single-sided, single-density, flexible (floppy) disks.

Starting Up

First start up *System Utilities*.

1. Put the disk
   labeled *System
   Utilities* in the
   built-in disk
   drive.

2. Turn on your
   monitor.

3. Turn on your
   computer.

In a moment, you see the System Utilities Main Menu (Figure 1-1).

Figure 1-1. System Utilities *Main Menu*

Menu Name

Highlighted Option

Numbered Option

Your Instructions

How to Get Help

```
System Utilities              Main Menu
Copyright Apple Computer, Inc., 1984


Work on Individual Files

1.  <COPY FILES>
2.  Delete Files
3.  Rename Files
4.  Lock/Unlock Files

Work on Entire Disks

5.  Duplicate a Disk
6.  Format a Disk
7.  Identify and Catalog a Disk
8.  Advanced Operations

9.  Exit System Utilities

Type a number or press ↓ or ↑ to select
an option.  Then press RETURN. _

For Help: Press ⌘-? or ⌘-?
```

Using 80 Columns? If you are using an 80-column display, your screen will look slightly different.

Duplicate a Disk

You're going to be duplicating a disk, which is the fifth option on the Main Menu, so you want to highlight that option.

You can also choose from a menu by typing the option's number and pressing (RETURN). In this case, you would press (5) and then (RETURN).

1. Press (↓) four times.

   Duplicate a Disk is highlighted (the option is changed to uppercase and enclosed in angled brackets).

2. Press (RETURN).

   This accepts the highlighted option.

Your screen looks like Figure 1-2.

Figure 1-2. Source Disk Display

```
                                   Duplicate a Disk
                                    ESC: Main Menu
_____


Where is your source disk?

1. <BUILT-IN DRIVE>

2.   External Drive

3.   ProDOS Pathname




Type a number or press ↓ or ↑ to select
an option.   Then press RETURN. _
_____
For Help:   Press ⌂-? or ⌘-?
```

The source disk is the original—the disk you're copying from.

The Source Disk display invites you to supply information about the location of the disk you want to copy from (the source disk).

You want to make a copy of the *System Utilities* disk, which is in the built-in disk drive.

3. Press (RETURN).   The option you want is highlighted, so you just have to accept it.

Now you're asked to supply information about the location of the disk you want to copy to (the destination disk).

The destination disk is the new disk—the disk you're copying to.

How you answer this question, and how you proceed, depends on whether or not you have an external disk drive. If you have an external disk drive, read the next section. If you don't have an external disk drive, skip the next section and read the section "Built-in Disk Drive Only."

Built-in Disk Drive and External Disk Drive

Because you have two disk drives, you can use the built-in disk drive for your source disk and the external disk drive for your destination disk.

1. Press (↓) once.   External Drive is highlighted.

2. Press (RETURN).   This accepts the highlighted option.

You see a message telling you where to put your source and destination disks.

Your source disk, *System Utilities*, is already in the built-in disk drive, so all you have to do is put your destination disk in the external disk drive and tell the computer you're ready to start copying.

3. Put a blank disk in the external disk drive.

4. Press (RETURN).

A default is what the program thinks you will want.

You see a message telling you the source disk's operating system, and then you see a message requesting a name for your copy and a default answer:

Enter Name of New Volume: /UTILITIES

UTILITIES is the name of the *System Utilities* disk. That name will be fine for the destination disk, so accept it.

5. Press (RETURN).   **UTILITIES** is used to name your
                              destination disk.

A short while after that, you see this message: **Formatting...** (Disks have to be formatted before information can be recorded on them for the first time.) Then you see: **Done!**

After that, you see this message: **Duplicating...** Then you see: **Done!** That's all there is to it.

Skip the next section for single disk drive users and proceed to the section "Finishing Up."

Built-in Disk Drive Only

You're going to alternate between putting your source disk and your destination disk in the built-in drive until the duplication is complete. But first you need to supply information about the location of your destination disk.

1. Press (RETURN).   This indicates that you'll be putting
                              your destination disk in the built-in
                              disk drive.

First you see a message telling you to put the source disk in the built-in drive. Your source disk is *System Utilities*, which is already in the built-in disk drive.

2. Press (RETURN).

Then you see a message telling you to put your destination disk in the built-in disk drive.

3. Replace *System Utilities* with a blank disk and press (RETURN).

Pressing (RETURN) lets the computer know you are ready to continue.

A default is what the program thinks you will want.

Volume is another word for disk.

You see a message telling you the source disk's operating system, and then you see a message requesting a name for your copy and a default answer:

Enter Name of New Volume: /UTILITIES

UTILITIES is the name of the *System Utilities* disk. That name will be fine for the destination disk, so accept it.

4. Press (RETURN).

UTILITIES is used to name your destination disk.

After a few seconds, you see this message: **Formatting...** (Disks have to be formatted before information can be recorded on them for the first time.) Then you see: **Done!**

After that, watch for messages on the screen telling you when to swap *System Utilities* (the source disk) for your blank disk (the destination disk). Be patient—the copy procedure involves quite a few swaps. When it's all over, you see this message: **Disk Copy Complete**.

Finishing Up

Take your new backup copy of *System Utilities* out of the disk drive and label it using a felt-tip pen (using a ball-point pen or a pencil can damage the disk).

Put the original *System Utilities* disk in a safe place and use your backup copy from now on.

Copying Disks: You can use Duplicate a Disk to copy all the disks that come with the interactive guide, but don't be surprised if you can't duplicate every application program you buy. Many manufacturers copy protect their disks to protect themselves from software pirates who illegally duplicate and distribute their programs.

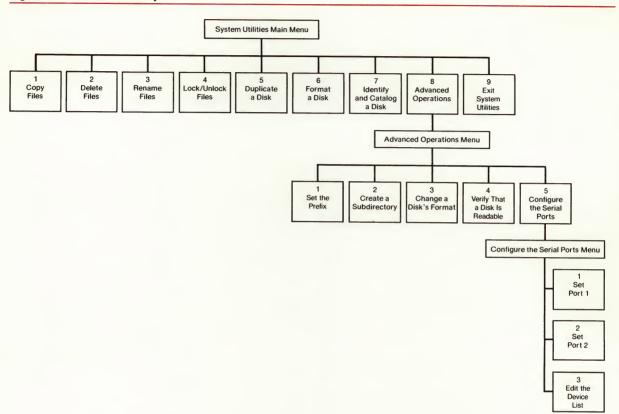Return to the Main Menu by pressing (ESC).

Now What?

Now that you've had some hands-on experience with Duplicate a Disk, you're probably eager to see what else *System Utilities* can do.

- Chapter 2 offers some general instructions for using the disk.
- Chapter 3 summarizes the utilities available on the disk.
- Chapter 4 explains how to adapt the ports on the back of the Apple IIc for printers, plotters, or modems that don't work automatically with the Apple IIc.

For those who like the big picture, here's a roadmap of *System Utilities.*

Figure 1-3. Utilities Roadmap

Chapter 1: Introduction

Chapter 2

General Instructions

As you discovered when you used *System Utilities* to make a backup copy, using the utilities is fairly straightforward. Messages on the screen tell you what your options are and ask you for information the program needs. Rely on these prompts and you should have no trouble using any of the utilities on this disk.

Prompts are messages on the screen.

Getting Help

Press (⌃)-(?) or (⌘)-(?) for helpful hints.

If you hit a snag, press (⌃)-(?) and you'll get a screen full of on-line coaching. (See Figure 2-1.) If the help screens don't answer your questions, review the general instructions in this chapter and in Chapter 3.

Figure 2-1. System Utilities Main Menu

```
System Utilities                    Main Menu
--------------------------------------------
| Delete Files permanently removes          |
| individual files from your disk           |
| without affecting other files on          |
| the disk.  If you want to erase           |
| everything on a disk, it's quicker        |
| to use Format a Disk.                     |
|                                           |
| Press RETURN to continue.                 |
|_____|
Work on Entire Disks

5.   Duplicate a Disk
6.   Format a Disk
7.   Identify and Catalog a Disk
8.   Advanced Operations

9.   Exit System Utilities

Type a number or press ↓ or ↑ to select
an option. Then press RETURN. _

For Help:   Press ⌘-? or -?
```

The help message you get depends on where you are in the *System Utilities* disk. If **DELETE A FILE** is highlighted on the Main Menu, you'll get the message in Figure 2-1. As you use the different utilities, try pressing ⌘-? to see what message you get. You may find that the help messages let you get by without using this book at all!

Selecting From a Menu

There are two ways to select items from a *System Utilities* menu:

- Type the number of your selection and press (RETURN).
- Press (↑) or (↓) to highlight your selection and then press (RETURN).

Selecting the Disk Drive

Once you pick the utility you want to use, you're usually asked to select the location of the disk you'll be working on. If you're going to put the disk in the built-in disk drive, select option 1, Built-in Disk Drive. If you're going to put the disk in the external disk drive, select option 2, External Disk Drive. It's as simple as that.

The source disk is the disk you're copying from.

The destination disk is the disk you're copying to.

With some utilities, like Duplicate a Disk and Copy a File, you are asked for the location of two disks: the disk you're copying from (the source disk) and the disk you're copying to (the destination disk). If you have an external disk drive, you can put your source disk in one drive and your destination disk in the other. If you don't, select the built-in disk drive as the location for both the source and destination disks and watch for messages on the screen that tell you when to swap the source disk for the destination disk.

A pathname is the full name of a file. It begins with the name of the disk (or volume), then lists any subdirectories (if you use subdirectories), and ends with the filename. Each name in the pathname is separated with a slash.

Selecting by Pathname: If the disk you're working on is ProDOS-based, you have the option of identifying files by pathname (the third option) instead of by disk drive. If you use subdirectories, you must use this option.

Selecting Files

What happens after you select a utility and disk drives depends on whether you're working on the disk as a whole or on individual files. If you're working on the disk as a whole, your job is practically finished. Watch the screen for any remaining instructions. If you're working on files, you are asked whether you want to select some of the files on the disk or all of the files.
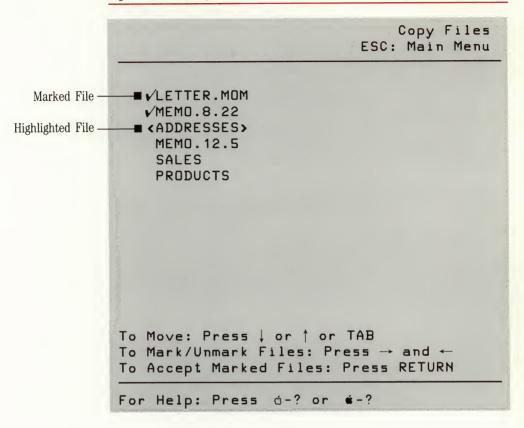
If you want to copy, delete, or lock all the files on the disk, press (A) (for *All*) and then (RETURN). Then watch for messages on the screen that tell you what to do.

If you want to select only some of the files on the disk for copying, renaming, or whatever, press (RETURN) to accept the default. The next screen you see is a list of all the files on the disk.

Press (↓) or (↑) to highlight a file you want to work on. Press (→) to mark the file. A check will appear next to the file. (If you change your mind, you can unmark the file by moving the highlight to it and pressing (←).)

If there is more than one row of files on the screen, press (TAB) to move back and forth between rows.

Figure 2-2. Marking Files

```
                                              Copy Files
                                          ESC: Main Menu

Marked File ────────■ ✓LETTER.MOM
                      ✓MEMO.8.22
Highlighted File ───■ <ADDRESSES>
                      MEMO.12.5
                      SALES
                      PRODUCTS




To Move: Press ↓ or ↑ or TAB
To Mark/Unmark Files: Press → and ←
To Accept Marked Files: Press RETURN

For Help: Press ⌂-? or ⌐-?
```

When you've marked all the files, press (RETURN). Then watch for
screen messages that tell you what your Apple IIc is doing and what
you should do.

Naming Disks and Files

Some utilities will ask you to give your disk or file a name. You can be as creative as you want, within these guidelines:

- Names must begin with a letter.
- Names must be made up of only letters, numbers, and periods.
- Names cannot have any spaces or punctuation other than periods.
- Names cannot have more than 15 characters (except Pascal volume names, which can have only seven characters).

Volume is another word for disk.

By the Way: Rules for naming DOS 3.3 and Pascal files are different from the ones just outlined, but if you follow these general rules, you won't have to worry about which operating system you're working with.

Defaults

When the program asks you to name a disk or a file, it usually provides a default name for you. You can accept the default by pressing (RETURN), you can override the default by typing in a new name, or you can edit the default.

It's called a default because it will be used by default if you don't provide an alternative.

To enter an entirely new name, just start typing the name. (The default disappears.) Press (RETURN) when you're finished typing the name. To edit the default, press (→) and (←) to move the cursor to the spot where you want to insert characters and type them in. Press (DELETE) to erase characters to the left of cursor. Press (RETURN) when you are finished editing the name.

Making Your Escape

Wherever you are in *System Utilities*, you can press (ESC) to return to the previous menu.

Pressing (ESC) while you are in the middle of a file utility lets you stop what you are doing at the first opportunity. This comes in handy if you change your mind after you start using a utility.

Quitting

When you are finished using *System Utilities*, select the last option on the Main Menu: Exit System Utilities. You are asked if you are sure you want to leave *System Utilities*. If you are sure, answer *Yes* by pressing (RETURN), and you'll exit to Applesoft BASIC.

If you left *System Utilities* by mistake, select *No*, and you'll find yourself back at the Main Menu.

If you want to start up an application program, put the program disk in the built-in drive and hold down (Ó) and (CONTROL) while you press (RESET).

Chapter 3   The Utilities

This chapter summarizes the utilities on the *System Utilities* disk.

Copy Files

Copy Files lets you copy a file or files from one disk to another. It comes in handy when you want to share data or programs with friends or business associates. (If you want to copy all the files on a disk, you're better off using the Duplicate a Disk utility.)

Make sure your destination disk has the same format as your source disk (ProDOS, DOS 3.3, or Pascal), or the files will be converted to the destination disk's format as they're copied.

Delete Files

Delete Files lets you permanently erase files that have outlived their usefulness so you can reuse the disk space. (If you want to delete everything on a disk, use the Format a Disk utility.)

Rename Files

You don't need written instructions for using these utilities. Just choose the utility you want from the *System Utilities* Main Menu and follow the instructions that appear on the screen. If you get stuck, press ⌘-? for more detailed instructions.

Rename Files lets you rename a file without changing its contents.

Changing the Name of a Disk: If you want to rename a disk, make a copy of the disk by using Duplicate a Disk and give the new copy the new name.

Lock/Unlock Files

Lock/Unlock Files lets you lock files so you don't delete them, rename them, or change their contents by mistake. If you're sure you want to delete or alter a locked file, you can also use this utility to unlock it.

Duplicate a Disk

As you discovered in Chapter 1, Duplicate a Disk lets you make an exact copy of a disk. If you believe in insurance for your home and car, you'll want to take out some disk insurance with this invaluable utility.

Don't Take Chances: When you're making copies of important disks, it's a good idea to cover the notch on your source disk with one of the sticky write-protect tabs that come with blank disks—just in case you get your source and destination disks confused during the copy process. (Some disks don't have write-enable notches. You couldn't change the contents of the disk even if you wanted to, so with these disks you don't have to worry about using a write-protect tab.)

If any of the disk-related terms, such as write-enable notch and write-protect tab, are new to you, see the interactive owner's guide.

Format a Disk

Formatting a disk means dividing the magnetic surface of the disk into sections where information can be stored. You can't store information on a blank disk until it has been formatted.

So why don't blank disks come preformatted? Disks don't come preformatted because different operating systems store information on disks in different ways. Your word processing data disk has to be formatted for the operating system your word processing program uses. If your home finance program has a Pascal operating system and your word processing program has a ProDOS operating system, you'll need two different data disks.

If you know which operating system your program requires (it's often printed on the label or mentioned in the manual), you can save time by supplying that information when the formatting utility asks for it. (See Figure 3-1). If you don't have a clue, the utilities disk can figure out the operating system and format the disk accordingly. Here's how.

An operating system is a program that controls things: for instance, the way information is loaded into memory, the way the computer works with information, and the way information is stored on a disk. There are three operating systems available for the Apple IIc: ProDOS, Pascal, and DOS 3.3.

Formatting When You Don't Know the Operating System

1. Select the Format a Disk option from the Main Menu.
2. Select the disk drive you're going to use (built-in or external).
3. Type 4 and press (RETURN). The program will ask you to put your application program disk in the built-in disk drive or the external disk drive (depending on which drive you specified in step 2).

Important! | If you're using the built-in disk drive, be sure to remove your *System Utilities* disk before inserting the program disk.

Important! | It's a good idea to cover the write-enable notch on your application program disk (if it has a notch) with a write-protect tab so you won't format it by mistake if you forget to take it out of the disk drive.

4. Put your application program disk in the appropriate drive and press (RETURN). In a few seconds you'll see a display telling you the disk's operating system and the volume name of your application program disk.

5. Type a name for the disk you're about to format. (The name you type will replace the name of your application program disk that now appears on your screen.)

6. Press (RETURN). The program will ask you to put the disk you want to format in the built-in or external disk drive.

Important! | If you haven't done so already, take your application program out of the disk drive.

7. Put the disk you want to format in the appropriate drive and press (RETURN.)

If the disk is blank, it will be formatted. If the disk has something on it, you'll be asked **okay to destroy the disk?** If you don't mind losing what's on that disk, type **Y** for yes and it will be formatted. If you put the wrong disk in the drive by mistake, type **N** and no harm is done. Although you must format blank disks before you can use them, disks don't have to be blank to be formatted. It is important, however, that the information on the used disk be expendable. When you format a disk, *everything* that was stored on the disk is erased.

The destination disk is the disk you copy to.

The only time you don't have to format blank disks before you use them is when you use the Duplicate a Disk utility. Duplicate a Disk formats the **destination disk** before copying information onto it.

Identify and Catalog a Disk

You don't need written instructions for using these utilities. Just choose the utility you want from the *System Utilities* Main Menu and follow the instructions that appear on the screen. If you get stuck, press Ⓒ-⑦ for more detailed instructions.

Identify and Catalog a Disk displays a list of what's on a disk. It's a valuable tool because you can't open a disk, as you can a book, to see what's inside, and it's a nuisance to keep a written record of every file you save on a disk.

In addition to telling you which files are on a disk, Identify and Catalog a Disk tells you the disk's operating system, the disk's name (or number in the case of DOS 3.2 or DOS 3.3 disks), each file's type, each file's size, the number of files on the disk, the number of blocks or sectors taken up by the files, and how many blocks or sectors are available on the disk.

Advanced Operations

In addition to the utilities listed on the Main Menu, there are five advanced utilities: Configure the Serial Ports, Verify That a Disk Is Readable, Change a Disk's Format, Create a Subdirectory, and Set the Prefix. (Create a Subdirectory and Set the Prefix apply only to ProDOS disks.)

To get to the Advanced Operations Menu, select Advanced Operations from the System Utilities Main Menu. You'll see the display shown in Figure 3-1.

Figure 3-1. Advanced Operations Menu

```
                    Advanced Operations

                    ESC:  Main Menu
_____


ProDOS Only

1.  <SET THE PREFIX>
2.  Create a Subdirectory

Advanced Operations

3.   Change a Disk's Format
4.   Verify That a Disk is Readable
5.   Configure the Serial Ports




Type a number or press ↓ or ↑ to select
an option. Then press RETURN.  _
_____
For Help:   Press ⌂-? or  -?
```

Set the Prefix (ProDOS Only)

A **prefix** is the first part of a pathname. A pathname is the full name of a file. It begins with the name of the disk (or volume), then lists any subdirectories (if you use subdirectories), and ends with the filename. Each name in the pathname is separated with a slash. For example: /USA/UTAH/SALT.LAKE

Set the Prefix lets you store the first part of a **pathname** (the volume name and any subdirectory names) in the memory of the computer so you can access files in that directory or subdirectory simply by typing the rest of the pathname (usually just the filename). Once you set the **prefix**, it stays set until you change it or turn off the computer. To override a prefix, type a complete pathname beginning with a slash.

Create a Subdirectory (ProDOS Only)

When a disk is first formatted, two things happen: the disk's recording surface is divided into sections where information can be stored, and the disk gets a directory (or catalog). Every file you save on the disk is listed in that directory.

If your disk is ProDOS formatted, you can set up subdirectories within the disk directory and group related files. Before you can put files in a subdirectory, you must create it, using this utility.

Subdirectories are like drawers in a file cabinet. Imagine a disk named MONEY with two subdirectories—one called INCOME, the other called EXPENSES. To access a file called FREELANCE in the INCOME subdirectory on this disk, you'd supply the file's pathname: the name of the disk, then the name of the subdirectory, and, finally, the name of the file (each name separated with a slash). Here's how it would look:

/MONEY/INCOME/FREELANCE

If you organize your files into subdirectories, you must supply the ProDOS pathname to get to your files—instead of the location of the disk (built-in or external disk drive).

If you're going to be using files in the same subdirectory for a while, you can save typing time by setting a prefix. See "Set the Prefix (ProDOS Only)."

Verify That a Disk Is Readable

Verify That a Disk Is Readable checks to see if a disk is OK. Disks are sturdy enough to withstand hundreds of trips in and out of the disk drive, but they become temperamental if you leave them on the dashboard all afternoon in the hot sun or otherwise abuse them. Occasionally, disks are damaged during manufacture.

Use Verify That a Disk Is Readable to check newly formatted disks before entrusting valuable data to them. You can also use this utility to check disks you suspect have been damaged. If you discover that a disk is bad, use Copy Files to salvage any files you can to another disk. Then reformat the disk and check it again using this utility. If it's still bad, throw it away.

Change a Disk's Format

Change a Disk's Format lets you convert disks from DOS 3.2 to DOS 3.3, DOS 3.3 to ProDOS, and ProDOS to DOS 3.3.

▲ Warning
This utility makes it possible for a program to be stored and retrieved by an operating system other than the one under which the program was originally written. To make the program run under the new operating system, you sometimes have to make changes to the code.

Configure the Serial Ports

You don't need written instructions for using these utilities. Just choose the utility you want from the *Advanced Utilities* Menu and follow the instructions that appear on the screen. If you get stuck, press ⌘-? for more detailed instructions.

Configure the Serial Ports lets you set up the printer and modem ports on your Apple IIc to communicate with devices that don't work automatically with the Apple IIc. This utility is explained in detail in Chapter 4.

Chapter 4

Configure the Serial Ports

Serial devices send and receive information one bit at a time while parallel devices send and receive information eight bits (one byte) at a time.

Most of the utilities on *System Utilities* are related to files or disks. The exception is Configure the Serial Ports, one of the options on the Advanced Operations Menu.

Configure the Serial Ports lets you adapt the printer or modem ports on your Apple IIc to communicate with devices that don't work automatically with your computer.

Important!

You will need to use this utility only if your peripheral device doesn't work automatically with the Apple IIc.

When you turn on the power, the Apple IIc serial ports are automatically set up, or configured, to communicate with an Apple Scribe or an Apple Imagewriter printer in the printer port (port 1) and an Apple 300 Baud Modem in the modem port (port 2). If you have these devices, or a device that uses the same configuration (speaks the same language), just plug in your printer or modem, and you're ready to go.

Printing a copy of a catalog is one of your options when you use the Identify and Catalog a Disk utility.

The easiest way to find out if your printer will work automatically with the Apple IIc is to plug it into the printer port and try printing a catalog of *System Utilities*. If it works, your device has a standard configuration. If you get a page full of garbage, you need to configure the port for your device.

Try Your Application Programs: Some application programs will override the configuration, so try printing something after starting up your application program. If it works, you don't need to configure your printer port.

To find out if your modem will work with the Apple IIc, plug it into the modem port and try sending or receiving a message. If it works, you don't need to configure your modem port. If it doesn't, you'll need to configure one of the ports for your modem.

The nice thing about the serial ports is that you're not limited to Apple and similarly configured devices. The serial ports can be configured to accommodate a wide variety of peripheral devices. Configuring a port tells the port how to communicate with a particular peripheral device.

You don't have to be a programmer to configure a serial port on the Apple IIc. All you have to do is answer a set of multiple choice questions about your peripheral device, and the configuration utility will tell the port how to communicate with your device.

You should be able to find the answers to all of the multiple choice questions in the manual that came with your device. If you can't find the answer, accept the default. (The default answers are the most common settings.) If that doesn't work, you'll find a set of troubleshooting tips later in this chapter, and you can use trial and error to find the right configuration for your device.

Once you answer the multiple choice questions about your device, the configuration utility

A product identification number (PIN) describes a device's characteristics and is used to configure the serial ports of the Apple IIc.

■ Displays a **product identification number (PIN)** for your device

■ Configures port 1 or port 2 for your device

■ Gives you the chance to save your device's PIN on your utilities disk as the new default configuration for port 1 or port 2.

More Than Two Serial Devices: If you have several devices that will share ports 1 and 2, or if you have different configurations for the same device—maybe you use the same modem to communicate with two information services with different configuration requirements—the configuration utility lets you list all of your devices and their PINs. That way, when you swap devices, all you have to do is select the device from the list and let the utility set up the port for you. (You'll learn how in "Editing the Device List.") If you have one or two devices, you don't need to list them; you can just make their PINs the defaults for ports 1 and 2.

Saving PINs for Next Time

Once you've figured out a device's PIN, you never have to do it again. That PIN can be saved on your utilities disk. But when you turn off the computer's power, your new serial port configuration is erased from the computer's memory (because PINs are stored in **random-access** memory). So, you need to configure the serial ports for your devices every time you turn on the power. Fortunately, it's very simple.

Random-access memory is explained in the interactive owner's guide.

All you have to do is start up your copy of the utilities disk. Once you see the Main Menu, your customized serial port configuration is set. Then replace your utilities disk with the application program's disk and restart the computer by holding down (⌘) while you press (CONTROL)-(RESET).

Some Application Programs Configure Ports for You: Some application programs, designed for the Apple IIc, will ask for PINs and configure the serial ports for you so you won't have to start up your utilities disk before starting up the application. If you don't know the PIN for your device, use the configuration utility or Figure 4-1 to derive it.

Switching Application Programs: If you leave the computer's power on, you should be able to switch from one application program to another without reconfiguring the serial ports. However, some programs may inadvertently interfere with the PIN settings (by using the same part of memory). If you lose touch with your peripheral devices, start up your utilities disk (to reconfigure the ports), then start up your application program by pressing ⟨Ć⟩⟨CONTROL⟩⟨RESET⟩.

So much for background. The first step in configuring a serial port is determining your device's product identification number.

The Parts of the PIN

Here's what goes into determining your device's PIN (product identification number). You might want to look up the information for your device (and write it down on the form at the end of this section) before using the configuration utility. That way, when the utility asks for your device's baud rate, data format, and so on, you'll have the answers at your fingertips. If you already know the PIN for your device, you can skip this section and go on to "Setting the Serial Ports."

Some printer and modem manuals provide the PIN for the device, allowing you to bypass the multiple choice questions.

Mode

Mode is a general purpose computer term. In this case, it refers to the method of communicating with a peripheral device. If you're configuring the port for a printer or plotter, choose printer mode. If you're configuring the port for a modem, choose communications mode.

```
1.   Printer Mode
2.   Communications Mode
```

Data Bits and Stop Bits

The computer sends and receives each character of information (or data) as a string of bits (zeros and ones). Characters can be represented with six, seven, or eight data bits. Stop bits indicate the end of a character. You can have one stop bit or two. There are six possibilities for the way the device receives or sends characters:

```
1.   6 Data Bits / 1 Stop Bit
2.   6 Data Bits / 2 Stop Bits
3.   7 Data Bits / 1 Stop Bit
4.   7 Data Bits / 2 Stop Bits
5.   8 Data Bits / 1 Stop Bit
6.   8 Data Bits / 2 Stop Bits
```

If you can't find this information in your manual (data bits and stop bits are usually listed under "data format" or on a specifications page), the most common data format for printers is eight data bits and two stop bits.

Choosing the data format for a modem depends on the information service you're using. Consult the manual provided by the information service to find out what data format to use. If you can't find any specifications for data format, use the most common format for modems: eight data bits and one stop bit. (If that doesn't work, try seven data bits and two stop bits.)

Baud Rate

Computers send and receive information at a certain speed measured in bits per second, also known as the baud rate. There are seven possible speeds:

```
1.   110 Bits per Second
2.   300 Bits per Second
3.   1200 Bits per Second
4.   2400 Bits per Second
5.   4800 Bits per Second
6.   9600 Bits per Second
7.   19200 Bits per Second
```

You'll usually find this information on a specifications page in the manual that came with your printer or modem. The most common printer speed is 9600 baud. The most common modem baud rate is 300. The important thing is that your printer and computer, or your modem and the information service, are using the same baud rate.

Parity

Some devices use a parity bit for error checking—to check to see if data got garbled during transmission. There are five possibilities:

1.   No Parity
2.   Even Parity
3.   Odd Parity
4.   Mark Parity
5.   Space Parity

If you can't find parity bit information in your device's manual, choose option 1.

Video Echo

How you set video echo for a modem depends on whether you're communicating with a computer set to full duplex or to half duplex. (Most information services use full duplex.) Full duplex will echo every character you transmit back to your video monitor. So you should choose option 1. (If you choose option 2, you'll get two of every character on your screen.)

A half duplex setting won't echo the characters you transmit, so if you want to see what you're sending out, you must echo the output, option 2.

It's best to set option 1 for printers because echoing output to the screen can limit the line width of what you're printing to the line width of the screen.

1.   Do Not Echo Output on Screen
2.   Echo Output on Screen

When in doubt, choose option 1.

Line Feed

Some printers and some application programs automatically generate a line feed (go to the next line) after each carriage return; others don't.

When in doubt, generate a line feed, option 2, and try printing something. If it looks right, you're in business. If everything is double-spaced, make sure the automatic line feed switch on your printer is *off*. If you still get double-spacing, the extra line feed is coming from your application program and you should change to option 1.

LF stands for line feed. CR stands for carriage return.

```
1.   Do Not Insert LF After CR
2.   Insert LF After CR
```

Line Width

Line width indicates the number of characters that your printer will print per line (before generating a carriage return). Set it to the greatest width your printer can handle. The most common setting is 80 characters. Many application programs let you set the width from within the program. If that's the case, or if you find the computer adding carriage returns where they don't belong, choose option 1 and the computer won't try to control line width.

Always choose option 1 for plotters.

```
1.   Do Not Insert CR
2.   Insert CR After 40 Characters
3.   Insert CR After 72 Characters
4.   Insert CR After 80 Characters
5.   Insert CR After 132 Characters
```

Important! If you selected Communications Mode, the utility picks option 1 for you.

Write It Down
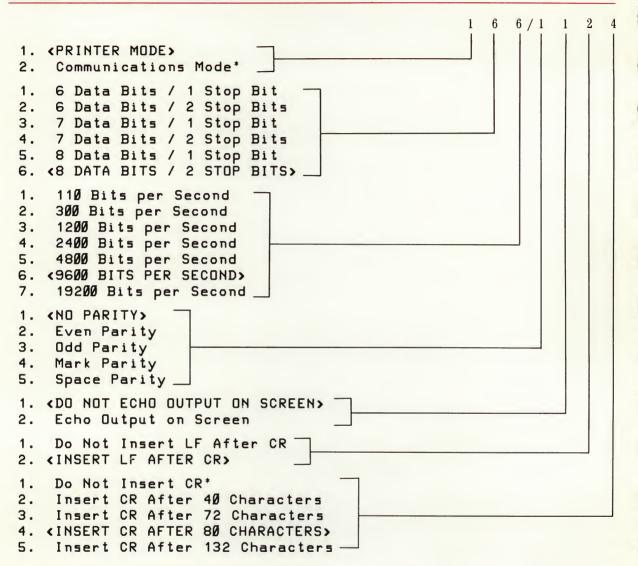
Here's a summary of the defaults for each port. You might want to fill in your own settings for reference and comparison. Remember, if you can't find one of the settings in the manual supplied with your device or information service, go with the default.

Port 1 Default	Your Device
Printer Mode	_____
8 Data Bits / 2 Stop Bits	_____
9600 Bits per Second	_____
No Parity	_____
Do Not Echo Output on Screen	_____
Insert LF After CR	_____
Insert CR After 80 Characters	_____

Port 2 Default	Your Device
Communications Mode	_____
8 Data Bits / 1 Stop Bit	_____
300 Bits per Second	_____
No Parity	_____
Do Not Echo Output on Screen	_____
Insert LF After CR	_____
Do Not Insert CR	_____

Figuring Out Your Own PIN

Once you know the baud rate and other information about your device, you can either let the program derive your PIN or you can figure it out yourself using Figure 4-1.

Figure 4-1. Determining a PIN. The number is made up of seven digits.
Each digit corresponds to an option number.

```
                                                        1   6   6 / 1   1   2   4

1.  <PRINTER MODE>          ┐
2.   Communications Mode*   ┘

1.   6 Data Bits / 1 Stop Bit   ┐
2.   6 Data Bits / 2 Stop Bits
3.   7 Data Bits / 1 Stop Bit
4.   7 Data Bits / 2 Stop Bits
5.   8 Data Bits / 1 Stop Bit
6.  <8 DATA BITS / 2 STOP BITS>  ┘

1.    110 Bits per Second    ┐
2.    300 Bits per Second
3.   1200 Bits per Second
4.   2400 Bits per Second
5.   4800 Bits per Second
6.  <9600 BITS PER SECOND>
7.   19200 Bits per Second   ┘

1.  <NO PARITY>     ┐
2.   Even Parity
3.   Odd Parity
4.   Mark Parity
5.   Space Parity   ┘

1.  <DO NOT ECHO OUTPUT ON SCREEN>   ┐
2.   Echo Output on Screen           ┘

1.   Do Not Insert LF After CR   ┐
2.  <INSERT LF AFTER CR>          ┘

1.   Do Not Insert CR*            ┐
2.   Insert CR After 40 Characters
3.   Insert CR After 72 Characters
4.  <INSERT CR AFTER 80 CHARACTERS>
5.   Insert CR After 132 Characters  ┘
```

*   If you select Communications Mode, digit 7
    must be 1 (Do Not Insert CR).

Setting the Serial Ports

Once you know which settings you need or have found out your device's PIN, you're ready to use the Configure the Serial Ports utility.

Before you go any further, make a copy of *System Utilities* (if you haven't already), and use the backup copy when you configure your serial ports. The configuration program writes information on the disk (if you save your configuration), and you can't alter the original *System Utilities*—it's write protected to prevent you from erasing or writing over valuable information by mistake. And because the utility writes on the disk, be sure your backup copy does not have a write-protect tab.

1. Start up your copy of the utilities disk.

By the Way: If you're already using your copy of the utilities disk, return to the Main Menu by pressing (ESC).

2. Choose Advanced Operations from the Main Menu.
3. Choose Configure the Serial Ports from the Advanced Operations Menu. You see a screen similar to Figure 4-2.

Figure 4-2. Configure the Serial Ports Menu. The current devices are listed with their PINs.

```
                        Configure the Serial Ports
                           ESC: Advanced Operations
 _____

  What do you want to do?

  1. <SET PORT 1>
       Apple Printer (166/1124)

  2.   Set Port 2
       Apple 300 Baud Modem (252/1111)

  3.   Edit the Device List




  Type a number or press ↓ or ↑ to select
  an option. Then press RETURN. _
 _____

  For Help:   Press ⌂-? or -?
```

4. Choose the port you want to configure. You see your device list. It looks like Figure 4-3.

Figure 4-3. Typical Device List

```
                                              Set Port 1
                     ESC: Configure the Serial Ports


Select the Device for Port 1:

1.  <APPLE PRINTER (166/1124)>
2.  Apple 300 Baud Modem (252/1111)
3.  Apple 1200 Baud Modem (253/1111)
4.  Apple Color Plotter (166/1121)
5.  Your Device
6.  Your Device
7.  Your Device

8.  I Know My PIN
9.  I Don't Know My PIN




Type a number or press ↓ or ↑ to select
an option. Then press RETURN. _

For Help:   Press ⌂-? or -?
```

5. If your device is listed, choose it.

If it's not listed, but you know the PIN, choose 8. You see a message asking you to type the PIN. Type the number and press (RETURN). You are asked if the PIN is correct. If the PIN is correct, answer *Yes* by pressing (RETURN). (If it's not, select *No* and press (RETURN), and you can try again.)

If you don't know the PIN, choose 9. Supply the information that is requested about your device. (If you're unsure about any of the answers, accept the default.) When you supply all the information, you see a screen summarizing the information and displaying your PIN. If the information is correct, answer *Yes* by pressing (RETURN). (If it's not, select *No* and press (RETURN), and you'll have another chance at all the settings.)

6. Then you are asked if you want to save the configuration on your utilities disk. If you answer *Yes* by pressing (RETURN), the information is saved on your disk as the default PIN for the port you are configuring. If you select *No*, the port is configured, but the PIN isn't saved on the disk for later use.

That's all there is to it. If you need to reconfigure the other port, do so the same way. When you've got both ports configured, start up the program you want to use by holding down (⌘) and (CONTROL) while you press (RESET).

Try printing something or sending a message through your modem. If you have any problems, consult the troubleshooting section that follows.

Troubleshooting

If you had to guess at any of the settings, don't be surprised if your first crack at configuring the serial ports didn't work. Here are some guidelines to help you decide which settings are wrong and how you should adjust them.

Trial and Error: Don't be afraid to experiment with different settings until you find one that works—you won't break the computer or your peripheral device. But do it systematically. The most common cause of garbage is the wrong baud rate. Other problems have distinctive symptoms that will suggest what the problem is and what you can do about it.

Troubleshooting Tips

Here are some suggestions for getting your ports configured correctly. Try the suggested solutions one at a time until you find one that works.

Symptom	Solution
Unintentional double or triple spacing.	Turn the automatic line feed switch on the printer (or change the application program's line feed setting) to *off*.
	Change the PIN so a line feed after a carriage return is not inserted.
	Both of the above.
Lines are printing on top of each other.	Turn the automatic line feed switch on the printer to *on*.
	Change the PIN so a line feed after a carriage return is inserted.
Characters are lost during data transfer.	Change to a lower baud rate, if possible, on both the sending and receiving ends.

Symptom	Solution
General garbage.	Check the baud rate you are using against the device's manual—if it's wrong, change the PIN or change the switch on your printer or modem.
	Check the data format (data bits/stop bits/parity) against the device's manual—if it's wrong, change the PIN or change the switch on your printer or modem.
Unintentional carriage returns.	Change the line width so that a carriage return is not generated. This lets the application program insert its own carriage returns.
Text runs off the page.	Set the line width to a lower number.
Two of every character appear on the screen while sending messages through a modem.	Change the PIN so output is not echoed on the screen.
Information sent through a modem doesn't appear on the screen.	Change the PIN so output is echoed on the screen.
Output to a printer is the same width as the screen when you wanted it wider.	Change the PIN so output is not echoed on the screen.

Troubleshooting Techniques

Some symptoms give you unmistakable clues to what the problem is. For example, if you're getting too many line feeds after a carriage return, you know that you have to adjust the line feed on your printer—through your application program or by changing the PIN. Problems with line width and echo are equally easy to detect and solve.

Problems with baud rate and with data format (data bits/stop bits/parity) are a little tougher to diagnose. They all produce a string of unrelated characters (**garbage** in the computer vernacular).

If you get garbage on your printer or display, start by checking the baud rate in the manual. (If you can't find the baud rate for your printer or plotter, try 9600, then 1200. If you can't find the baud rate for your modem, try 300, then 1200.)

If baud rate isn't the problem, experiment with different data formats, starting at the top of Table 4-1 (for printers) and Table 4-2 (for modems) and working your way down. Use the boxes on the right to check off the combinations you've tried.

One Thing at a Time: Whatever you do, don't change all the settings at once. Alter one setting at a time, then make a test before going on to the next variation. And keep track of what you've tried so you don't keep going over the same ground.

Table 4-1. Common Printer Settings

Data Bits	Stop Bits	Parity	
8	2	off	☐
7	2	off	☐
8	2	odd	☐
8	2	even	☐
7	2	odd	☐
7	2	even	☐

Table 4-2. Common Modem Settings

Data Bits	Stop Bits	Parity	
8	1	off	☐
7	2	off	☐
7	1	off	☐
8	1	odd	☐
8	1	even	☐
7	2	odd	☐
7	1	even	☐

Important! Because of timing peculiarities in the baud rate generator of the Apple IIc, some modems may require a different data format than the one listed in the modem or information service manual. Experiment with different settings until you find the one that works.

Editing the Device List

If you have several devices that share the serial ports, you should add all of your devices and their PINs to the device list so that the ports are easy to reconfigure. The device list includes several popular Apple devices and has place holders for other devices. If you run out of space, you can replace the Apple devices that you don't plan to own. Here's how:

1. Select option 3, Edit the Device List, from the Configure the Serial Ports Menu.

2. Highlight the line you want to replace and press (RETURN). You see a new screen and this message:

   `Enter New Device Name:`
   `_ . . . . . . . . . . . . . . . . . . . . . . .`

3. Type a name for your device and press (RETURN).

4. You are asked if you know the device's PIN.

5. If you know the PIN, answer *Yes* by pressing ⟨RETURN⟩. Then type the number. You are asked if the PIN is correct. If you answer *Yes*, you see a new device list with your device's name and PIN.

   If you don't know the PIN, select *No* and press ⟨RETURN⟩, then choose the options that describe your device. (If you don't know which option to pick, accept the default by pressing ⟨RETURN⟩.) When you finish supplying the information, you see a screen, like Figure 4-4, that summarizes the information you supplied and displays the PIN. If the information is correct, answer *Yes* by pressing ⟨RETURN⟩.

Figure 4-4. Checking the Parts of the PIN

```
                                        Set Port 1
                ESC: Configure the Serial Ports


Printer Mode
8 Data Bits / 2 Stop Bits
1200 Bits per Second
No Parity
Do Not Echo Output on Screen
Insert LF After CR
Insert CR After 80 Characters

The PIN is 163/1124

Is this information correct?
   <YES>    No




Type Y for Yes or N for No, or press ←
or → to change.  Then press RETURN.

For Help:  Press ⌂-? or ⌘-?
```

6. Then you are asked if you want to save the configuration on your utilities disk. If you answer *Yes* by pressing (RETURN), the revised device list is copied onto your copy of the utilities disk so that you can use the information later.

Once all your devices are on the list, it's easy to swap port configurations. Here's how:

1. Start up your utilities disk.
2. Choose option 8, Advanced Operations, from the Main Menu.
3. Choose option 5, Configure the Serial Ports.
4. Choose the port you want to configure.
5. Choose the device you want to use.
6. Start up your application by putting the program disk in the built-in disk drive and holding down (⌘) while you press (CONTROL)-(RESET).

Glossary

accessory: Another word for **peripheral device**—something you attach to the computer (like a printer or a joystick) to make it a more powerful or playful machine.

Apple II: A family of computers. The granddaddy of the family, the Apple I, was invented in a garage in California. The newest and most compact addition is the Apple IIc, a transportable Apple II.

Applesoft BASIC: The Apple II dialect of the BASIC programming language. See **BASIC**.

application software: Programs designed for a particular purpose (such as home finance, education, word processing).

backup: A copy of a disk. (It's a good idea to make backup copies of all your important disks and use the backup.)

BASIC: Short for Beginners All-purpose Symbolic Instruction Code. The most popular computer language for personal computers. It's built into your Apple IIc.

baud: A designation for how fast peripheral devices can receive and/or send data.

bit: The smallest item of useful information a computer can handle. Usually represented as a one or a zero. Eight bits equals one byte.

boot: Another way to say **start up.**

bug: An error. The expression comes from the early days of computing when a moth flew into a room-size computer and caused a breakdown.

byte: A sequence of eight bits that represent an instruction, a letter, a number, or a punctuation mark.

carriage return: The event that occurs when the print head reaches the end of a line and returns to the start of the line.

catalog: A list of all the files on a disk. Sometimes called a directory.

chip: A small wafer containing thousands of microscopic components.

circuit board: A collection of integrated circuits (chips) on a board.

command: A word or character that causes the computer to do something.

compiler: A computer program that translates a language, such as Pascal, into a language the computer can understand. A compiler translates the entire program just once. Compare **interpreter.**

computer: A machine that processes words and numbers faster than a food processor can slice potatoes. Not particularly creative or intuitive, but very good at repetitious tasks.

configuration In the case of *System Utilities*, the way your serial ports are set up.

contrast knob: A dial on your video monitor that lets you adjust the brightness on the screen.

(CONTROL): A key on the Apple keyboard that when pressed in conjunction with another key makes that other key behave differently. It controls the operation of other keys.

copy protect: To prevent duplicating the contents of a disk. Compare write protect.

CR: See carriage return.

cursor: A blinking underline, rectangle, or other symbol that marks your place on the screen.

data: Information, especially raw or unprocessed information.

data base: A type of application program that helps you keep track of lists of information. Makes it easy to recall, update, and cross-reference information. (Also known as data management.)

data bits: The computer sends and receives information as a string of bits. These are called data bits.

data disk: A disk containing your work—letters, budgets, pictures, and so on.

default: A recommended response to a question in a program. The response will be used by default unless you supply an alternative.

destination: The disk you're copying to. Compare source.

device: Short for peripheral device. A machine attached to your computer, such as a printer or a modem.

directory: A list of all the files on a disk. Sometimes called catalog.

disk: A circle of flexible plastic coated with iron oxide (the same sort of thing they make cassette tape out of). You can buy programs prerecorded on disks, and you save your work on blank disks.

disk controller card: A circuit board that provides a connection between other models of the Apple II and one or more disk drives. This connection or interface is built into the Apple IIc.

disk drive: A device that loads information from disks into the memory of the computer and saves information from the memory of the computer onto a disk.

Disk Use light: A light that comes on when your disk drive is loading something from or storing something on a disk. When the light is off, it's safe to put disks in and take disks out of the drive. When the light is on, don't open the disk drive.

display: A general term to describe what you see on your screen when you're using a computer.

DOS: Short for Disk Operating System. See operating system.

DOS 3.2: An early Apple II operating system. DOS stands for Disk Operating System; 3.2 is the version number.

DOS 3.3: One of three operating systems used by the Apple IIc. DOS stands for Disk Operating System; 3.3 is the version number.

dot matrix printer: A type of printer that forms characters with patterns of dots.

Dvorak keyboard: An alternate keyboard layout, also known as the simplified keyboard.

80-column text card: A circuit board used in other models of the Apple II to double the number of characters across the screen. This capability is built into the Apple IIc.

80/40 Column switch: A switch that controls the number of horizontal columns or characters across your screen. A television can display a maximum of 40 characters across, while a monitor can display 80 characters across the screen.

envelope: A paper sleeve that protects disks when they're not in use. Compare **jacket.**

error message: The computer's way of alerting you to a failure in the communication process. Often accompanied by a beep.

file: A collection of information that you store on a disk (like a program or memo).

file management: A general term for copying files, deleting files, and other housekeeping chores involving the contents of disks.

firmware: Another name for the programs in ROM (read-only memory). It's more permanent than the software in RAM (random-access memory)—thus the name.

flexible disk: Another name for floppy disk. See **disk.**

floppy disk: Disks are called **floppy disks** or **floppies** because they're made of flexible plastic.

format: To divide a disk into sections where information can be stored. Disks must be formatted before you can save information on them. Also called **initialize.**

FORTRAN: Short for **FOR**mula **TRAN**slator. A computer language used mainly for scientific applications.

graphics: A fancy word for computer pictures.

hand controls: Computer accessories that move creatures and objects in game programs.

hardware: Those parts of the computer that you can see and touch. The computer and the machines that attach to it: the disk drive, printer, and other peripheral devices. Compare **software.**

highlight: In the case of *System Utilities*, a pair of angled brackets that distinguishes your selections from others in a list.

initialize: To prepare a disk so the computer can store information on it. Another word for **format.**

input/output: Abbreviated I/O. Refers to the means by which information is sent between the computer and its peripheral devices.

integrated circuit: Networks of microfine wire that conduct electrical impulses. They are etched on silicon wafers and embedded in black plastic.

interactive guide: Combines book, disks, and the computer for personal instruction.

interface: Hardware or software that links the computer to a device.

interface card: See peripheral card.

interpreter: A computer program that translates a language such as BASIC into a language the computer can understand. An interpreter translates the program each time you run the program. Compare compiler.

jacket: A square of plastic that protects a flexible disk. You don't remove the jacket (and expect to ever use the disk again). Compare envelope.

joystick: An accessory that moves creatures and objects in game programs.

K: Short for kilobyte. It's how computer memory is measured. The Apple IIc has 128K of RAM (random-access memory) and 16K of ROM (read-only memory). One K is equal to 1024 bytes.

keyboard: Your way of communicating with the computer. It looks like the keyboard on a typewriter, but programmers can make the keys do anything they want them to.

Keyboard switch: A switch above the keyboard that allows you to use the alternate character set for the Dvorak, or simplified, keyboard layout.

label: A strip of paper you stick on a flexible disk to identify it. The label is a good place to put your thumb when you pick up your disks.

LF: See line feed.

line feed: Act of advancing to the next line.

line width: Number of characters that fit on one line on the screen or on a page.

load: To put data or programs into the computer from a disk.

logic board: See main logic board.

Logo: A computer language that encourages learning through discovery. Easy and fun to learn, but powerful enough for serious application programming.

main logic board: A large circuit board that holds RAM, ROM, the microprocessor, custom-integrated circuits, and other components that make the computer a computer.

memory: Integrated circuits (chips) that store instructions for the microprocessor (the brain) of the computer. There are two kinds of memory: temporary memory (called RAM) and permanent memory (called ROM). RAM, or random-access memory, depends on electricity, and when the power goes off, it goes away. ROM, or read-only memory, does not.

menu: A list of choices.

microprocessor: The brain of the computer. The Apple IIc has a 65C02 eight-bit microprocessor.

mode: Manner of operating—in the case of *System Utilities*, either printer or communications (modem) mode.

modem: Short for modulator/demodulator. A device that links your computer to other computers and information services over telephone lines.

monitor: It looks like a TV, but it doesn't have channels. It displays instructions from the program to you and shows what you've typed into memory.

Monitor program: A built-in program that turns on the disk drive when you turn on the computer.

mouse: A pointing device.

operating system: A program that, among other things, controls the way information is loaded into memory, the way the computer works with the information, the way information is stored on a disk, and the way the computer talks to printers and other peripheral devices. ProDOS, DOS 3.3, and Pascal are three operating systems available for the Apple IIc.

oval cutout: An opening in the disk jacket through which the disk drive read-write head accesses the disk.

parallel: A way of sending data eight bits at a time. Compare serial.

parity: A bit used to check for errors during data transmission.

Pascal: A programming language taught in high school and college computer science courses because it stresses a systematic approach to problem solving.

pathname: The full name of a file. A pathname begins with the disk (volume) name, then lists any subdirectory names, and ends with the filename. Each part of the name is separated by a slash (/).

peripheral card: A circuit board you plug into other models of the Apple II to link the computer to a peripheral device. The interfaces for most popular peripheral devices are built into the Apple IIc.

peripheral device: A device that is connected to the computer, like a printer or a modem.

PIN: See product identification number.

plotter: A device that prints charts and graphs.

port: A connector on the back of the Apple IIc where you attach printers, hand controls, and other devices to your computer.

prefix: The first part of a pathname stored in memory.

ProDOS: The primary operating system for the Apple IIc.

product identification number: A seven-digit number that describes a device's characteristics, such as baud rate, used to configure the serial ports on the Apple IIc.

prompt: A message on the screen.

Power light: A light that tells you whether the machine is turned on or not.

power supply: A box that draws electrical power out of the power outlet and converts it to power the computer can use to do its computing.

Power switch: A rocker switch on the back of the computer that you turn on when you want to use your computer.

printer: A device that produces a paper copy of the information you create using the computer.

program: (n.) Instructions that tell the computer what to do. (v.) To write instructions for the computer—to talk to the computer in terms it understands.

radio-frequency (RF) modulator: A device that transforms your television set into a computer display device.

RAM: See **random-access memory**.

random-access memory (RAM): Temporary memory. RAM stores programs and data for the microprocessor.

read-only memory (ROM): Permanent memory. Applesoft BASIC is stored in ROM.

ROM: See **read-only memory**.

run: Something programs do when the computer is carrying out their instructions.

save: To store a program or data on a disk (as opposed to storing it in the memory of the computer).

scroll: To move all the text on the screen (usually upward) to make room for more text.

sector: When disks are formatted, they are divided into tracks and sectors. A sector is part of a track.

serial: Things occurring one after another—like soap operas. A serial interface means data is sent one bit at a time. Compare **parallel**.

serial port: Outlet for a peripheral device on the back of the Apple IIc.

simplified keyboard: The Dvorak keyboard.

simulation: A computerized representation of something in action.

65C02: The type of microprocessor (or brain) used in the Apple IIc.

slots: Long, narrow connectors inside other models of the Apple II that let you connect printers and other devices to the computer.

software: Instructions that tell the computer what to do. They're usually stored on disks. Compare **hardware**.

software directory: A book that lists available software.

spreadsheet: A type of application program that simplifies financial planning, cost estimating, and other number-crunching tasks. It is laid out in columns and rows.

source: The original—the disk you're copying from. Compare **destination**.

stop bits: One or two bits that indicate the end of a character.

startup disk: A disk containing an operating system and a self-starting program.

store: To file away for safekeeping. (Something you have to do with data you create using your computer. If you don't store your work on a disk, it will be lost forever when you turn off the computer.)

subdirectory: A directory within a directory.

traces: Electrical roads that connect the components on a circuit board.

track: When disks are formatted, a series of concentric circles are magnetically drawn on the disk. Each of these circles is a track. Compare **sector**.

users group: A computer club where members exchange information.

utilities: A set of file and disk management programs.

volume: Another word for **disk**.

video monitor: See **monitor**.
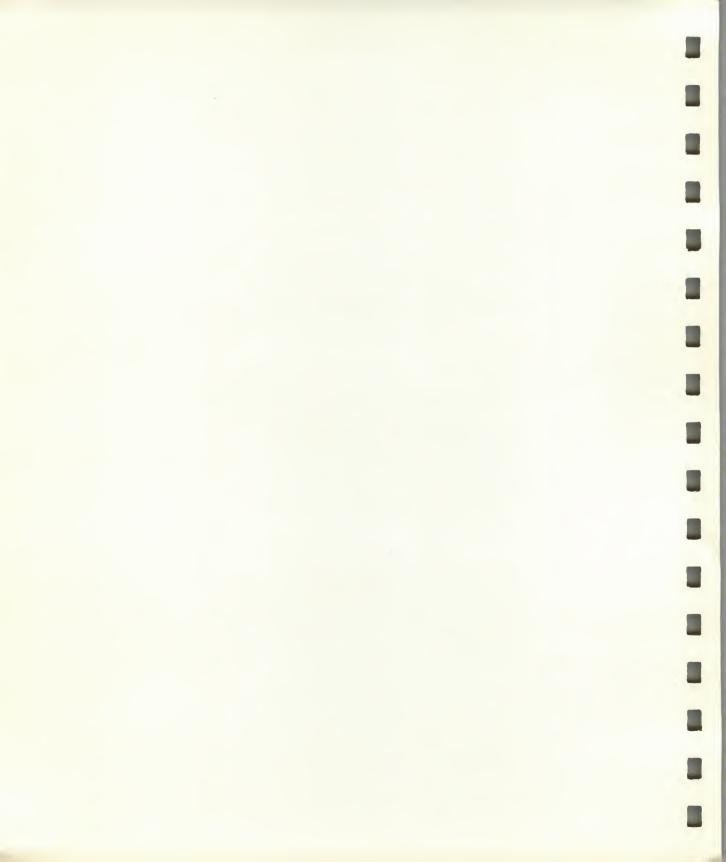
word processing: A type of application designed to make writing and editing easier and faster.

write-enable notch: A small, square cutout in the upper-right corner of the disk that indicates whether or not information can be recorded on the disk.

write protect: To prevent accidental changes to the contents of a disk by covering the write-enable notch. Compare copy protect.

write-protect tab: A piece of tape that you can use to cover the write-enable notch on a disk so information can't be recorded on it.

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